

QUANTUM AND CONSCIOUSNESS: IN SEARCH OF A NEW PARADIGM

by *Ervin Laszlo*

Abstract. Two fundamental issues raised by Lothar Schäfer are considered: (1) the question of a suitable paradigm within which the findings of quantum physics can be optimally interpreted and (2) the question of the assessment of the presence and importance of mind and consciousness in the universe. In regard to the former, I contend that the ideal of science is to interpret its findings in an optimally consistent and minimally speculative framework. In this context Schäfer's assertion that certain findings in quantum physics (those that relate to virtual states) indicate the presence of mind at the quantum level implies a dualistic and hence unnecessarily speculative assumption. In regard to the assessment of mind and consciousness, a consistent and parsimonious paradigm suggests that mind and consciousness are not part of a chain of events consisting of an admixture of physical and mental events but that physical events form a single, coherent set of events, and mental events another set, with the two sets related, as Teilhard (and a number of other philosophers, including Whitehead) affirmed, as the "within" and the "without" (or the "mental pole" and the "physical pole") of one and the same fundamental reality. This panpsychist as contrasted with Schäfer's dualist paradigm provides a single self-consistent framework for the interpretation of quantum (and all natural) events while recognizing the presence of mind in the universe as the least speculative realist implication of our immediate experience of consciousness.

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I am pleased to have this opportunity to comment on Lothar Schäfer's essay, because it provides an opportunity to reflect on some fundamental

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issues both in contemporary quantum physics and in the philosophy of mind and consciousness. I applaud Schäfer's courage in this important enterprise. I also applaud his insistence on the new facts coming to light in the quantum domain; they, too, are significant and deserve to be discussed. I do not agree with his interpretation of the ultimate nature of these facts, and, because his interpretation serves as the premise for his conclusions, I do not agree that his conclusions can be properly reached that way. I do agree with his assessment of his conclusions—namely, that mind and consciousness are integral and important elements in the universe.

The above issues are fundamental. They concern the conceptual structure in which quantum events are interpreted. And if quantum events are used as a premise for the understanding of the nature of mind and consciousness, they likewise concern our understanding of mind and consciousness. I take these issues in turn.

THE QUESTION OF A PARADIGM FOR QUANTUM PHYSICS

At issue is the conceptual substructure—the so-called paradigm—through which the findings of quantum physics are interpreted. Schäfer adopts a paradigm that, although widely used by quantum physicists, is in my view no longer adequate to the facts. It fragments reality into a mental and a physical domain, when this fragmentation is neither necessary nor desirable. Let me attempt something that could whimsically be called “paradigm repair” or, more appropriately, reflections on the basis for a paradigm shift in physics.

I preface my efforts by remarking on something that Schäfer—along with most if not all scientists—would readily agree to. This is the statement that physics seeks to grasp something fundamental about the nature of the world on the basis of observation and experiment and attempts to do so in a coherent and consistent manner using the fewest possible a priori assumptions. Albert Einstein put this well, saying that in science we are seeking the simplest possible scheme of thought that will bind together the observed facts. The simplest possible scheme of thought—the one that is (as Einstein also said) as simple as possible but not simpler—is that which obeys Occam's razor: it does not multiply entities (in this case, a priori assumptions) beyond the bounds of necessity. The simplest possible scheme of thought is the one that embraces the ensemble of the observed and implied facts in a way that it constitutes a valid aspect or element of what physicists can conceptualize as “physical reality.”

Scientists can legitimately assume that the reality to which their theories refer is complex and varied. They have a warrant, however, to assume that it is fundamentally diverse if and only if the facts they deal with stubbornly refuse to fit into a single coherent and consistent conceptual structure governed by a single a priori assumption about the nature of physical reality. For example, if they assume that physical reality is essentially material and

find that some of the facts they encounter are decidedly nonmaterial, that the phenomena to which they refer are not matterlike, they can assume that reality is both material and something else—perhaps mental or spiritual. The validity of this assumption is conditional on the refusal of some facts to fit into a framework that views reality as material.

I presume that Schäfer, a respected scientist, would prefer to embrace the least number of a priori assumptions in his conceptualization of physical reality. His essay is a testimony that the basic assumption he embraces is that physical reality is essentially material: If a fact is “matterlike,” he tells us, it is “real.” But he finds that not all of the facts coming to light in the quantum domain are matterlike. He is obliged, then, to posit a non-material domain, dimension, or element of reality in addition to the matterlike and “real” domain; this strange domain he calls “mindlike,” “transcendent,” and “mysterious.” I contend that his failure to fit the facts of quantum theory into a single consistent framework governed by a single basic a priori assumption about the nature of physical reality is due not to the nature of the facts but to the nature of the interpretation he, and many other quantum physicists, put on the facts. It results from an inadequate, even obsolete, paradigm.

The class of “observed facts” (more exactly, of observationally implied events) that Schäfer cannot accommodate under the concept of material reality consists of what physicists generally designate as “virtual states.” “Virtual,” for Schäfer, is not real in the sense that matter (or matterlike) is real. It is real in the sense that mind is real, but this is another kind of reality, derived from another a priori assumption about the nature of reality. Reality value in regard to physical reality is reserved for the class of facts that fits into the category of actualized states. These are said to be material (or matterlike) states. Virtual states do not fit into this category.

Schäfer refers to some of the giants of twentieth-century physics (such as A. S. Eddington and James Jeans) to legitimate his assumption that there is a class of facts that is essentially mindlike. But we are now in the twenty-first century, and more and more facts are coming to light that do not fit the materialist concept of physical reality. Quantum physics is full of such facts; they are the predominant kind of facts. Could it be that the fault lies with the materialist concept of physical reality?

The concept that is still dominant in the physics community is clearly not the classical concept of Newton’s classical mechanics, but it shows a strong family resemblance to it. The dominant concept still claims that for something to be real it has to be matterlike, and it is matterlike only if it is actualized—that is, if when probed it can be physically located with the help of a set of coordinates.

Why should physicists hold on to this notion of physical reality? Is it not more consistent with observed facts that what we call matter are particular integrations of in-themselves nonmaterial elements, ultimately

quarks, and the quantum fields that underlie quarks? Reality may be far more subtle and complex than the materialist philosophies had ever conceived. It may include not only states that are actualized but also states that quantum physicists denote as virtual.

Let us consider the meaning of *virtual*. The way quantum physicists use it, virtual is the opposite either of *real* or of *actual*. If it is the opposite of real, we have two classes of facts (or events): the real states and the virtual states. If a state is virtual, it is not real. If, however, virtual is taken to be the opposite of actual, this exclusion from reality does not apply. Both the virtual and the actual class of facts can refer to the same physical reality physicists assume is the referent of their theories. This would be the simpler, more parsimonious, and hence preferable interpretation. Let us see whether it makes sense.

In quantum theory a virtual state is one in which the wave function is not actualized. It differs from what is regarded as a real state only in this unique regard. Must we assume, then, that a state of which the wave function is not actualized is not an element of physical reality? I see no a priori reason for this assumption. A nonactualized wave function can be just as much a part of the reality of the universe as an actualized one. It need not be considered mysterious, transcendent, or mindlike. Whether or not we subscribe to this tenet depends on our notion of what constitutes physical reality. To subscribe to it may entail expanding our notion of physical reality. In a series of books published over more than a decade, I have argued that this expansion is both feasible and warranted by the facts coming to light in the full range of the empirical sciences: *The Creative Cosmos* (Laszlo 1993), *The Interconnected Universe* (1995), *The Whispering Pond* (1996c), *The Connectivity Hypothesis* (2001), *Science and the Akashic Field* (2004), and *Science and the Reenchantment of the Cosmos* (2006). I maintain that in an expanded concept of physical reality nonactualized states are as real as actualized ones. And if so, they are not properly called *virtual*, for this term has a persistent implication of unreality; it is difficult to rid ourselves of the notion that if something is virtual it is not real. However, we do not need the term *virtual* to designate nonactualized states. There is a simpler and more logical term, namely, *potential* (Latin *potentia*). A potential state need not be considered transcendent, mysterious, or mindlike. It is merely a physical event—in this case, the wave function of a quantum state—that is not actualized.

A given state can be potential, or it can be actual. In both cases it can be considered real, in the sense of indicating a state of affairs in the physical universe. But this is not what Schäfer and the majority of quantum physicists mean by *virtual*. Schäfer is explicit on this point. “The unobserved, wavelike states of potentia are thoughtlike; the results of quantum jumps, matterlike. Actualization is materialization” (Schäfer 2006, 524). Because matter is real, for Schäfer actualization is also reification. His process of

“virtual state actualization” (VSA) proceeds from the mindlike and unreal domain of a wider reality to the matterlike reality domain of the physical universe.

This crossover among different kinds of reality is not necessary. We can take the unobserved wavelike states of *potentia* as just as real as the results of quantum jumps. Then we remain firmly within the domain of physical reality. But in that case it would be wise to adjust the terminology: we should speak not of VSA but of PSA: potential state actualization.

The argument for the pertinent expanded concept of physical reality can be elucidated in the light of the evolution of fundamental conceptions in the history of physics. Newton’s concept of physical reality was essentially the same as Democritus’s concept: matter moving about in space, where matter (mass-points for Newton, atoms for Democritus) is the privileged reality, and space is the backdrop or container—passive, flat, and, except for matter, empty. This notion was questioned already in the nineteenth century. William Clifford, creator of the modern Clifford algebras, claimed that small portions of space are analogous to little hills on a surface that is, on average, flat; for them, the ordinary laws of geometry do not hold. The property of space to be curved or distorted is continually being passed on from one portion of space to another after the manner of a wave. This variation in the curvature of space is what really happens when matter moves. Thus, in the physical world nothing else takes place but this wavelike variation (cited by Wolf and Haselhurst 2005).

Half a century later, in a paper titled “The Concept of Space” (1930), Albert Einstein wrote, “We have now come to the conclusion that space is the primary thing and matter only secondary; we may say that space, in revenge for its former inferior position, is now eating up matter.” A few years later Erwin Schrödinger (1989) restated the basic insight: “What we observe as material bodies and forces,” he noted, “are nothing but shapes and variations in the structure of space.”

Physicists are now agreed that the structure of space can have shapes and variations, because it is neither empty nor flat. Space is a superdense field of turbulent virtual energies; more precisely, a field of action-quanta that generates energy: the “quantum vacuum.” Thus today we can say—as Clifford, Einstein, and Schrödinger likely would say—that material bodies and forces are nothing but shapes and variations in the structure of the quantum vacuum. Space, in the form of the quantum vacuum, is not a backdrop or container for the motion of matter but the very stuff or substance from which the matter that populates space and time emerged and through which it interacts.

The quantum vacuum, also called “physical vacuum,” “universal vacuum,” or simply “*nuether*,” is the origin of the particles that populate space and time and is the locus of the forces and fields of the universe. Thus the events known as virtual states can be considered nonactualized

states (or nonactualized wave functions of states) within the dynamic structure of space; more exactly, in the complex field that fills, and thus for all intents and purposes is, space. Nonactualized quantum states are remarkable states, but they are real states, not any more mysterious or transcendent than any other state known to physics.

THE QUESTION REGARDING THE PRESENCE OF MIND AND CONSCIOUSNESS IN THE UNIVERSE

So far we have dealt with the nature of the paradigm that can coherently and consistently serve the interpretation of findings in quantum physics. This is a crucially important issue but not the only one raised by Schäfer. He goes beyond quantum physics to consider the assessment of the nature and role of mind and consciousness in the universe—an issue of equal importance, though of a still more speculative nature.

Schäfer takes as his premise that virtual states at the quantum level are an indication of the presence of mind and consciousness throughout the domains of nature. Virtual states are mindlike events associated with quanta, and the same kind of events appear in a more explicit and manifest form in association with more complex entities, such as living organisms and human brains. It follows that if virtual states play an important role not only on the level of the quantum but throughout nature, mindlike events are widespread in the universe. This is an important conclusion worthy of exploration, even if we question the premise on which it is based.

I have argued that we can reinterpret quantum virtual states as bona fide elements of physical reality. Because Schäfer has shown that such events occur not only at the level of quanta but throughout nature, it would appear that by reinterpreting them as physical events we reduce the entire class of mind events to the status of physical events. This conclusion follows, however, only if we agree that virtual (nonactualized) states are the basis for inferring the presence of mind and consciousness. If we do not agree to this premise, we do not reach Schäfer's conclusion regarding the prevalence of mind in nature. And by negating the premise, we do not reach the converse conclusion (that mind events do not exist in nature); we do not reach *any* conclusion. We leave open the possibility that virtual states are no more an indication of mind in nature than actual states.

Is it the case, then, that we have no indication based on observation and experiment regarding the presence of mind and consciousness in the universe? This would be an unwarranted inference, and it is neither my nor Schäfer's intent to make it. I do wish, however, to maintain that virtual (or potential) states in themselves do not furnish the relevant indication. The evidence for mind and consciousness does not come from fragmenting physical reality into a matterlike and a mindlike domain but by considering our immediate experience of mind and consciousness. This is a major distinction, and it merits further analysis.

Consider the nature of the events that lead Schäfer to his conclusion regarding mind and consciousness. They consist of an admixture of two fundamentally different kinds of events: *physical event* → *mental event* → *physical event* → However, if my earlier argument is valid, the assumption that virtual states at the quantum level are mental events is neither necessary nor, in light of the ideals that govern the methodology of science, desirable. Then the logically indicated chain in regard to physical reality is *physical event* → *physical event* → *physical event* → This would seem to exclude mental events from the sphere of scientifically approachable reality, and Schäfer's conclusion, that mental events are a significant factor in the universe, would lack foundation.

I qualify the above assessment, however, in reference to what we have good reason to believe about the presence of mind and consciousness in the universe. There do seem to be mental events, and they are an important part of what we have good reason to consider the nature of the world. But they do not intrude as part of a causal chain within the sequence of physical events. Rather, we have two distinct chains of events: *physical event* → *physical event* → *physical event* → . . . and *mental event* → *mental event* → Experience shows that, at least in regard to human beings, the two sets of events are correlated. On the basis of his reading of Pierre Teilhard de Chardin, Schäfer would maintain that they are correlated throughout the domains of nature.

This conclusion can be maintained independently of the assessment that quantum events are essentially mindlike. Teilhard himself did not maintain it on that basis. He was clear on this point. As Schäfer himself notes, "Teilhard considered matter and consciousness not as 'two substances' or 'two different modes of existence' . . . but as 'two aspects of the same cosmic stuff'" (Schäfer 2006, 521). "Since the stuff of the universe has an inner aspect at one point of itself, there is necessarily a *double aspect to its structure*, that is to say in every region of space and time—in the same way, for instance, as it is granular: *coextensive with their Without, there is a Within to things*" (in Schäfer 2006, 522).

Affirming that there are two aspects of the "same stuff" is not the same as maintaining that there are two different "stuffs," the mental and the physical. The "within" is the mental aspect and the "without" the physical aspect of the same stuff. In the human being, for example, the mental aspect is consciousness, and the physical aspect is the firing of neurons in the brain. The same mental aspect is there in quanta, but there it is more difficult to discover, for it is less explicit. Schäfer believes that the latest discoveries of quantum physics constitute a discovery of this aspect. In this I do not follow him. Consciousness, and mental phenomena in general, are not discovered by examining the nature of interactions in the physical domain; at the most what we can discover in this way are processes that seem significantly undetermined (such as quantum jumps) and yet have a

logic of their own. These processes need not be referred to a mindlike or transcendent reality. They can be referred to the dynamic structure of the cosmic field that underlies the interaction of physical entities and assigns the distribution of their “permissible” and “nonpermissible” states.

Not even the choice of given quanta among the permissible states in the process of actualization is evidence for mind and consciousness. It is simply evidence that, although some choice is made, we do not understand (at least at present) the dynamics on the basis of which it is made. To say that therefore it must be a conscious or mental choice is to engage in an unnecessarily speculative leap. (And to refrain from making this leap is not to give up the thesis that the mental aspect is an important aspect of the universe.)

On the premise that the mental and the physical are two aspects of the same thing, the problem of their correlation is readily answered. They are harmonized, because, although distinct, they are not separate. We do not need to resort to metaphysical explanations, as often in the history of thought. Leibniz spoke of preestablished harmony; Plato referred the connection to the Soul, which is both a part of the physical world and, being immortal, also a part of the higher world of Forms and Ideas. Descartes believed that a part of the brain translates from the physical to the mental realm, a notion that was maintained by some contemporary scientists as well, including John Eccles.

We also do not need to find an explanation in terms of interaction. “Inter-action” presupposes that two distinct and otherwise separate things act each on the other. In this context it presupposes that the physical acts on the mental and the mental on the physical. This would mean that the mixed chain of events criticized above would hold after all. But this is not what Teilhard thought and not what Spinoza and Whitehead thought. They maintained that the physical and the mental are aspects of one and the same reality, and thus they are distinct but not separate. They are distinct and inseparable aspects of every quantum, every molecule, and every entity in the cosmos.

This thesis is stated explicitly by Whitehead, for whom all “actual entities” have a “physical pole” as well as a “mental pole” (1929, 40ff.). It is the position taken also by C. J. Jung in postulating the *unus mundus*, the deeper level of reality that in itself is neither physical nor psychical but is the basis for both *physis* and *psyche*. I have maintained it as well, expounding it in my early work, *Introduction to Systems Philosophy* (1972), as the thesis of “biperspectivism” and developing it as a form of panpsychism in my recent *Science and the Reenchantment of the Cosmos* (2006).

Distinct but not separate physical and mental aspects make a thing what it is, and *what* it is is reflected in the *way* it is. An electron acts the way it does because in addition to its physical pole it also has a mental pole, and humans act the way they do because in addition to a brain they also have

mind and consciousness. In a human being the mental pole is more explicit and differentiated than in the electron, for the human physical pole is more evolved and complex, and the two go together—they are aspects of the same thing. Hence it is not consciousness that acts on the brain or the brain that acts on consciousness. Consciousness is the “within aspect” and brain the external aspect. Humans have both aspects, the same as every actual entity in the universe. This is also the conclusion Schäfer comes to, but he arrives at it by way of a different premise.

The premise suggested here does not attribute mysterious mental qualities to a selected set of events in the universe but recognizes that all events are both physical and mental. The distinction is not negligible; dualism and panpsychism (if we use “isms” to denote the differing positions) convey an entirely different view of the world. The dual-aspect form of panpsychism is the more appropriate paradigm for natural science, for it leaves it free to deal with a coherent set of observed facts without burdening the theory with transcendent nonphysical elements. At the same time it does not fail to acknowledge the presence of mind in the universe by recognizing that the evidence for it—which is one’s own consciousness—is not an exceptional or supernatural phenomenon but an intrinsic inner aspect of all things in space and time.

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