

Illusions of Knowledge

Response to “Quantum Mechanics and the Brain” by Christof Koch and Klaus Hepp
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In their recent essay entitled “Quantum Mechanics and the Brain” Christof Koch and Klaus Hepp critique recent hypotheses connecting these two fields of inquiry. At one level, this paper appears to be scientifically well-informed. The authors begin their paper, for example, by acknowledging that the relation between quantum mechanics and higher brain functions is far from being understood. But the rest of the essay basically suggests that there’s nothing of significance to be understood, so there’s no problem. While this paper is scientifically astute, it is philosophically naïve, and this flaw makes the essay fundamentally misleading.

There are two large, unresolved problems looming over the scientific study of the mind and quantum physics. The first is the “hard problem,” namely how physical processes in the brain can generate or even influence subjective experience. Koch and Hepp gloss over this problem as if it doesn’t exist. They write:

“The problem of consciousness and its neuronal correlates is beginning to emerge in outlines. The content of consciousness is rich and highly differentiated. It is associated with the firing activity of a very large number of neurons spread all over the cortex and associated satellites, such as the thalamus. Thus, any one conscious percept or thought must be expressed in a wide-flung coalition of neurons firing together.”

In that statement they perform a sleight-of-hand, like clever magicians taking the audience’s eyes off their act of creating an illusion. With one hand, they correctly state that the content of consciousness is *associated* with the firing activity of a very large number of neurons. Then with the other hand—and this is where the sleight-of-hand comes in—they casually comment, “any one conscious percept or thought must be *expressed* in a wide-flung coalition of neurons firing together,” as if that is just as much a scientific fact as their first statement. But the latter is an uncorroborated assumption that covers over the hard problem as if it doesn’t exist. Scientists don’t know that any mental phenomenon is *expressed* as a physical phenomenon, that is, that it is nothing more than its correlated brain process. In fact, there is no scientific evidence that any mental event is identical to any coalition of neuronal firings. All we know is that there is a causal connection between certain neuronal firings and their correlated mental processes, but the nature of mental events themselves remains unknown. And simply stating as a scientific fact, with no empirical evidence or even rational argument, that they are expressed as neuronal firings is misleading. What is worse, this tactic of ignoring the hard problem and implying that it has already been solved obstructs creative, innovative strategies for actually solving this problem. The historian Daniel Boorstin has commented that “illusions of knowledge”—entailing the conflation of uncorroborated assumptions with knowledge—have historically proven to be the major obstacles to scientific discovery. Koch and Hepp promote exactly such an illusion of knowledge when they claim that mental events are expressed in configurations of neuronal activity, as if that’s all there is to them.

The major problem looming over quantum physics is the measurement problem, namely how the act of measurement seems to transform quantum processes, which are described as abstract mathematical formulas, into concrete physical phenomena, with real locations and velocities. Koch and Hepp choose an easy target in attacking the widely rejected von

Neumann-Wigner proposal that consciousness is directly involved in collapsing the wave function. In addressing the relation between quantum mechanics and the brain, Koch and Hepp choose another easy target—the microtubule hypothesis of Hameroff and Penrose—in which serious problems have been identified. In the meantime, Koch and Hepp treat the measurement problem as if it has been solved by introducing the theme of decoherence. But this is far from the case. Decoherence doesn't solve the measurement problem. It sweeps it under the rug and makes it look irrelevant for the rest of physics and our understanding of the universe at large. Many leading physicists think otherwise, but the complexities of this problem are overlooked in this paper, presenting one more illusion of knowledge.

Just as Koch single-mindedly focuses on neurobiology for understanding consciousness—thereby sweeping the hard problem under the rug—so does Hepp marginalize quantum physics in the universe at large by assuming that nature quarantines quantum effects through decoherence. Koch's approach to the study of the mind takes us no closer to understanding the real nature of consciousness than Hepp's approach does to understanding the measurement problem. But with their sleight-of-hand approach to quantum mechanics and the brain, they leave readers with the impression that what they don't understand is irrelevant or nonexistent. As long as scientific thinking about the mind and brain remains embedded in the illusions of knowledge of nineteenth-century materialism, the hard problem and the measurement problem will remain unsolved, and the cognitive sciences will have to wait yet longer before they undergo their first true revolution.