



Reflections on Quantum and Consciousness

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Chris unpacks a different perspective on the relationship between quantum theory and consciousness.

This title points to two words which still challenge our understanding and still stand out as important, even after decades of theory and discussion. At first glance there seems to be no connection between consciousness (the core of our human awareness) and quantum (the laws of change in the smallest parts of matter). And yet each one seems to validate the other. I will, however, start with consciousness and quantum separately.

A. Consciousness

What I mean by consciousness is our capacity for sharing in *isness*, as Meister Eckhart calls it — a sharing to any degree, from the smallest intimation of the being of a tiny beetle, to Martin Buber's ecstatic "he is a THOU and fills the heavens". Most importantly, it is a capacity for sharing aspects and events that, to some extent, are parts of oneself. This sharing in *isness* often encompasses the sense of *what it is like to be* that other. It can be a transformative experience, as I once experienced after several days of sitting with a small cluster of trees, and suddenly found myself to be a part of them, sharing their being. This sort of sharing can even extend to a sharing in the void, in emptiness. I experienced this under nitrous oxide, and later realised that it was echoed in Jung's *Seven Sermons to the Dead*, when he enters a space that is totally dark, boundless and spaceless apart from a single star.

It is crucial to note that consciousness grasps *that* a certain being *is*. It is not about working out *what* that being is or does. This distinction, as it were between communion and analysis, has been made clear over the last 20 years through two seminal books:

First, Teasdale and Barnard concluded from experimental work in psychology that mental activity took place as if it was structured by a number of "interacting cognitive subsystems". Several of these systems dealt with mundane issues controlling the body and processing inputs from the senses, but there were two main systems that jointly organised the mind as a whole. One, that was closely related to language and reasoning, they called the "propositional". The other, that maintained the integrity of the person through relationships with the rest of the world they called the "implicational". It is now often called the "relational".

Later Iain McGilchrist in his book *The Master and his Emissary* described these systems in terms of the more familiar right and left hemispheres of the brain, the right associated with the implicational subsystem and the left with the propositional subsystem. Subsequently all three authors agreed that their two approaches were essentially equivalent, with the propositional subsystem more involved with the left hemisphere and the implicational more involved with the right.

Consciousness as I have defined it is not some universal field, but is always the consciousness of a particular being. This begs the question of what a "being" is, in this context. While I claimed above that an intimately entwined copse of trees was for me a "being", I would be surprised if this was the case with, say, the untidy scattering of books on my desk. What is it that makes a collection into a being? We will return to this in connection with quantum theory.

B. Quantum

There is a popular view that quantum theory sprung fully formed from the mind of Schrödinger, like Athena born from the forehead of Zeus. This was far from the case: there was a gradual development in the understanding of quantum theory, during which the connection with consciousness came and went and several different interpretations appeared. I will give a very skeletal chronological table of authors and ideas, to give a feeling for its faltering progress.

1900. Max Planck: "energy [is] composed of ... equal finite packages". And a little later "I called [the packages] 'quanta of action'"

1913 Niels Bohr: Proposed that the electrons in atoms move in fixed orbits, but could jump randomly from one orbit to another, according to rules developed from Planck's work.

1925- 1926: Erwin Schrödinger proposes that particles can also behave as waves. This dual wave/particle is called a *wave function*.

1932: John von Neumann describes in detail how quantum mechanics can be extended to describe the process of the mechanical measurement of a wave function.

1939: Fritz London and Edmond Bauer argue that Von Neumann's process of measurement requires the intervention of consciousness if a definite result is to appear.

To quote in translation from the preface to their booklet, by Paul Langevin:

"a coupling, even with a measuring device, is not yet a measurement. A measurement is achieved only when the position of the pointer has been observed. It is precisely this increase of knowledge, acquired by observation, that gives the observer the right to choose among the different components of the mixture predicted by the theory, to reject those which are not observed, and to attribute thenceforth to the object a new wave function, that of the pure case which he has found. We note the essential role played by the consciousness of the observer in this transition from the mixture to the pure case."

1962: A. Daneri, A. Loinger and G.M. Prosperi argue that it is the mere massiveness of a measuring device that fixes the result, without London and Bauer's use of consciousness.

1970: Heinz-Dieter Zeh extends the above work, showing that the small perturbations of electromagnetism, heat and so on, that are present throughout the universe, invariably turn a quantum wave function into an array of probabilities, such as one can calculate after rolling a die, for example. This is called "decoherence". While a system retains its pure quantum state it is termed "coherent".

Viewing this history as a whole, we can note that, as far as mainstream physics is concerned, consciousness was thought

to play a role only in a period of 23 years in the middle of the 100 years of quantum theory so far. But if we do not invoke consciousness as a real player in physics, then there has to be some alternative. A popular alternative is the "many-worlds interpretation of quantum theory", in which at every quantum measurement the entire universe splits into many copies, each with a different outcome of the measurement. But surely a direct action of consciousness is preferable to this, even though we are unsure as to what consciousness is? In the absence of a definitive purely physical account of quantum theory, there remains a viable non-mainstream group, with Henry Stapp the most influential member, who argue that Zeh's work does not invalidate the role of consciousness.

C. Quantum and beings

Can quantum and consciousness really come together? The alternative would be to make do with Crick's "You are nothing but a pack of neurons" and Everett's many-worlds quantum theory. But I think it's worth trying to do better; and one way of achieving this might be found in the notion of a "being", introduced in A as the place of being, *is-ness* and consciousness. Though I disparage Crick's saying, neurons do have a lot to do with all of our thinking. But a neuron is far too

big to preserve a pure quantum state: it would immediately succumb to Zeh's decoherence mentioned above. And it is far too small on its own to support anything that we would recognise as part of our consciousness.

There remains the possibility, at present only a pipe dream, that the world can be regarded as a hierarchical array of nested subsystems, where the consciousness within of each one enables them to integrate into a consciousness within a higher one. Consciousness could then climb indefinitely upwards from intra-cellular organelles (which Penrose has suggested as carriers of quantum coherence leading to a primitive consciousness) and eventually to the entire universe, providing at last a credible physical support for the bursting *isness* that we at times feel around us.

A full and accessible account of these ideas, with biography and background notes, is given in my recent *Knowing, Doing and Being* (Imprint Academic, 2013) – see review section.

For the historical background see: Quantum Approaches to Consciousness, Stanford Encyclopedia of Philosophy, <http://plato.stanford.edu/entries/qt-consciousness/>



Sunset Over the Gulf of Mexico. From the International Space Station, Dec. 14, 2014.

Photo courtesy of NASA