

Consciousness as life-contingent, evolutionary, and emergent

Note—Philip Clayton’s definition of emergence provides a framework for this paper. Clayton states: “Emergence is the view that new and unpredictable phenomena are naturally produced by interactions in nature; that these new structures, organisms, and ideas are not reducible to the sub- systems on which they depend; and that the newly evolved realities in turn exercise a causal influence on the parts out of which they arose. The emergence thesis suggests that consciousness or what we call mind is derived from and is dependent upon complex bio- logical systems (...) but consciousness is not utterly unique; conscious phenomena also manifest important analogies to emergent realities at much earlier points in evolutionary history. In so far as it recognizes that consciousness is in one sense ‘just another emergent level’, emergence theory is not dualism in disguise.” Philip Clayton (2004), *Mind and Emergence: From Quantum to Consciousness*, p. vi).

In order to consider an intrinsic inter-relationship between consciousness and life, one needs to understand that life in biological organisms and non-cellular entities is not strictly limited to a reductionist understanding of behavioral and functional phenomena. To do so, it is first indispensable to set aside the conceptual gap between life and consciousness, where the latter is a “hard problem” that leaves life as the “easy problem.” Second, the intrinsic relationship between consciousness and life benefits from an understanding of emergence as a process in a whole that can change the condition of its constituent parts. Additionally, an evolutionary perspective on the relationship between life and consciousness may broaden our understanding beyond an anthropocentric approach and a present-biased understanding of consciousness. Finally, in taking into account the origin of life and origin of consciousness, it is important to consider a move beyond what has remained ‘physically familiar’ to what may be ‘physically possible,’ pushing the latter to even include “strong emergence,” or renewed assessment of physical laws.

1. In order to consider an intrinsic inter-relationship between consciousness and life, one needs to understand that life in biological organisms and non-cellular entities is not strictly limited to a reductionist understanding of behavioral and functional phenomena. [Neurobiology]
2. To do so, it is first indispensable to set aside the conceptual gap between life and consciousness, where the latter is a “hard problem” that leaves life as the “easy problem”:
 - a. “Many philosophers of mind today believe that a profound difference exists between consciousness and mere biological life...Consciousness, or more precisely, so-called phenomenal consciousness, is thought to be an internal, subjective, qualitative, and intrinsic property of certain mental states. Life, on the other hand, is thought to be an external, objective, structural, and functional property of physical systems. According to this way of thinking, there is no equivalent hard problem about how biological life is related to physical structure and function(...) Chalmers [says] there is no hard problem about life for vitalism, only a problem about understanding how a physical system could carry out various vital functions (metabolism, growth, repair, reproduction, and so on). This interpretation, however, seems incorrect (...) To make headway on the process of consciousness, we need to go beyond dualistic concepts of consciousness and life in standard formulations of the hard problem. In particular, we need to go beyond the idea that life is simply and ‘external’ phenomenon in the usual materialist sense. Contrary to both dualism and materialism, life or living being is already beyond the gap between ‘internal’ and ‘external’. A purely external or outside view of structure and function is inadequate for life.” Evan Thompson (2007), *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*, HUP Press, 223-4. [Philosophy of science/Critical science studies]

3. Second, the intrinsic relationship between consciousness and life benefits from an understanding of emergence as a process in a whole that can change the condition of its constituent parts:
 - a. “Rather than arguing that the interactions of parts of an emergent whole produce new properties, inherit new properties, inherit new properties by virtue of their involvement in the whole, or exhibit new properties imposed by the whole configuration, he [Paul Humphreys (1997), “How Properties Emerge,” *Philosophy of Science* 64:1-17] argues that in many cases parts are significantly transformed as a result of being merged with one another in some larger configuration. Humphreys maintains that in some cases the very constitution of parts is changed by inclusion in some larger unity(...) [where] by virtue of their systemic involvement with each other, they are no longer distinguishable. As a result, reductionist decomposition cannot be completed because what were once independently identifiable parts no longer exist.” Terrence Deacon, 2012, *Incomplete Nature: How Mind Emerged from Matter*, W.W. Norton and Company, p. 162. [Philosophy/Critical science studies]
 - b. “At the end of a paper discussing his process approach to emergence, Mark Bickhard boldly asserts “Mental states do not exist, any more than do flame states—both are processes” [“Process and Emergence: Normative Function and Representation,” in J. Seibt, ed. *Process Theories: Crossdisciplinary Studies in Dynamic Categories*, Dordrecht, Netherlands: Kluwer Academic]. This may be a bit too extreme, but it drives home a crucial point: these phenomena consist in the special character of the transformations *between* states, not in the constitution of things at any slice in time (...) Being alive does not merely consist in being composed in a particular way. It consists of *changing* in a particular way (...) We can of course dissect organisms and cells, and isolate and study the molecules, molecular complexes, and chemical reactions that they consist of (...) [but] in an organism, the very notion of a part is process-dependent.” Terrence Deacon, *Incomplete Nature*, p. 175-6. [Philosophy/Critical science studies]
4. Additionally, an evolutionary perspective on the relationship between life and consciousness may broaden our understanding beyond an anthropocentric approach and a present-biased understanding of consciousness:
 - a. “...The fundamental origin of qualia [may arise] from the very properties of physical mechanisms present in the living organism, and [be] more ancient than the cognitive processing of a complex brain (...) Qualia [may] represent a specialization of [a] primitive sensorium” Rodolfo R. Llinás, *i of the vortex: From Neurons to the Self*, MIT Press, pp. 210-12. [Evolutionary biology/comparative physiology/neurobiology]
 - b. “The organization of the nervous system of [the octopus] is totally different from the organization we learned is capable of [types of activity] in the vertebrate brain. If we are faced with the sobering fact that there are two [or more] possible solutions to the “intelligence” problem, there may well be a large number of possible architectures that could provide the basis of what we consider necessary for cognition and qualia. Given the principle of parsimony, the onus of proof lies with those who believe that these animals are devoid of qualia (...) Ultimately, we see that the architecture capable of generating cognition must relate to the motricity upon which such cognition was developed” [this is the conclusion of a larger exposition by Llinás about consciousness as developing through movement]. R. Llinás, pp. 263-5. [Evolutionary biology/comparative physiology/neurobiology]
5. Finally, in taking into account the origin of life and origin of consciousness, it is important to consider a move beyond what has remained ‘physically familiar’ to what may

be ‘physically possible’—pushing the latter to even include “strong emergence,” or reassessment of the behavior of physical laws.

a. “...The issue of consciousness has already played a significant role in physical theory, either implicitly or explicitly. One of these is in connection with the anthropic principle (...) Any universe that can ‘be observed’ must, as a logical necessity, be capable of supporting conscious mentality, since consciousness is precisely what plays the ultimate role of the ‘observer.’ This fundamental requirement could well provide constraints on the universe’s physical laws, or physical parameters, in order that conscious mentality can (and will) exist.” Roger Penrose, *The Road to Reality: A Complete Guide to the Laws of the Universe*, Alfred A. Knopf, p. 1030. [Quantum physics]

b. There are several readings I would posit in this direction, first and foremost being Max Tegmark (2014), “Consciousness as a state of matter”. An earlier text that touched on similar ideas is Henry P. Stapp (1997), “The Hard Problem: A Quantum Approach,” in *Explaining Consciousness: The Hard Problem*, ed. Jonathan Shear p. 197-215 (see also all the articles under the “Physics” section of that same book, as well as David Chalmers concluding commentary, “Moving Forward on the Problem of Consciousness,” pp. 379-422). Finally, I would include Jeremy England (2013), “Statistical physics of self-replication,” *Journal of Chemical Physics*, 139, 121923. [Quantum physics/biophysics]