

Can Anything Emerge from Nothing?

**Incomplete Nature:
How Mind Emerged from Matter**
by Terrence W. Deacon.
Norton, 602 pp., \$29.95

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Incomplete Nature is about an important and difficult subject: how life and mind evolved from a world of inanimate matter. It is also about what are the right concepts to use in understanding the nature and workings of life and mind. We need to be able to conceive them in such a way that it becomes intelligible that they could have arisen naturally from the kinds of inanimate processes described in physics and chemistry.

Terrence W. Deacon approaches these questions with the apparatus of dynamic systems theory, which describes the operations of complex systems that are autonomous, self-maintaining, stable over time, and resistant to the tendency toward disorder called entropy. The model of such systems, at a primitive level, is the biological cell, which makes up further more complex dynamic systems such as organs and whole organisms. The cell maintains its integrity over time by means of an enclosing membrane that is selectively permeable, letting in only such molecules as will serve its self-preserving needs: performing basic metabolism and expelling waste products. It is a self-organizing unit (unlike a humanly constructed machine) that admits of teleological description—it has goals toward which its activities tend—and that contains the essential ingredients of life. One of its central capacities is counteracting the effects of the second law of thermodynamics: it creates order and resists chaos. Some cells have a further capacity—the capacity to produce copies of themselves. In these capacities life ultimately consists.

Deacon's strategy is to try to show that such a basic biological form could arise from something yet more primitive, which he calls an "autogen." The thought is that stable but active inanimate systems, like whirlpools, tornadoes, and "autocatalytic molecules"—systems that maintain their existence notwithstanding material interaction and change—might provide the conceptual perspective that enables us to see how primitive life might have evolved.

We have, Deacon says, to imagine a molecular compound that maintains itself by taking in energy from its environment and creating the chemical structures that define it (this process is often called "autopoiesis"). The advantage of this way of thinking is that we avoid certain theoretical pitfalls—chiefly "saltations," "homunculi," and "preformationism": that is, respectively, unexplained leaps forward in the evolutionary process, surreptitiously introduced forms of intelligence that direct the proceedings, and postulating that the evolved entity was really there all along (as if cells existed at the time of the big bang, but invisibly). What we are seeking is a theory of emergence that demonstrates continuity with what was there before, while not supposing that it was present at the beginning. Then, and only then, we shall understand how life and mind might

spring from a world of lifeless insensate matter.

I shall divide my assessment of Deacon's lengthy disquisition on these issues into three parts: his style of writing, his originality, and the value of his ideas. There is much to criticize under each heading, though also points to praise.

Deacon's prose style can only be described as abominable. It is heavy with jargon and pointless neologisms; it is repetitive and longwinded; it is rarely clear. His intention seems to be to sound as impressive as possible, impressiveness being equated with the frequent

point, you have probably found some parts of the text quite difficult to follow. Perhaps you have struggled without success to make sense of some claim or unclear description." Indeed—but then why not try to make it a bit easier to follow? In my view, he is pompously dressing up relatively banal ideas in what he fondly supposes to be imposing and intimidating prose—instead of just plain annoying prose.

The author is also confident of his originality, sometimes stridently so. The entire tone of the book is that of someone boldly striking out on his own against orthodoxy; and toward the end he speaks of his "hitherto unexplored alternative framing of these enigmatic



René Antoine Houasse: Birth of Minerva, Fully Armed, from the Head of Jupiter; late seventeenth century

use of scientific-sounding long words, without any regard for clarity and ease of grammatical processing. Here are some entirely typical examples:

So the dependence of teleodynamics on morphodynamics and morphodynamics on thermodynamics constitutes a three-stage nested hierarchy of modes of dynamics, which ultimately links the most basic orthograde process—the second law of thermodynamics—with the teleodynamic logic of living and mental processes.

Pain is the extreme epitome of the general phenomenology we call emotion because of the way it radically utilizes the mobilization of metabolic resources to powerfully constrain signal differentiation processes, and thereby extrinsically drive and inhibit specific spontaneous morphodynamic tendencies.

Five hundred pages of this rebarbative word-spinning are enough to daunt even the most determined reader (it certainly ruined my vacation break). I am professionally accustomed to reading long unreadable books, but this is by far the most unreadable book I have ever encountered. It is obviously completely unsuitable for the interested general reader, for whom one assumes the book is primarily intended.

Even Deacon, who refers to his "sometimes tortured prose," seems to be aware of his verbal thickets when he remarks: "If you have read to this

problems," of these "paths [that] have not been followed previously because they were not even visible within current paradigms," and his "hope that this glimpse of another scientifically rigorous, but not simplistically materialistic, way to view these issues will inspire others to explore some of the many domains now made visible."

One would never think from reading *Incomplete Nature* that the author's main contentions have already been systematically developed by others, and that there is in fact hardly an original idea in the book. Two works, in particular, stand out in the prior literature: *Dynamics in Action* by Alicia Juarrero¹ and *Mind in Life* by Evan Thompson.² Neither book is cited by Deacon, although they cover much the same ground as his—far more lucidly and insightfully.

Deacon's thesis that dynamic systems theory requires us to rethink causality and rediscover Aristotle's notion of formal cause is fully anticipated in Juarrero's book, as is the application of systems theory to problems of life and mind. I have no way of knowing whether Deacon was aware of these books when he was writing his: if he was, he should have cited them; if he was not, a simple literature search would have easily turned them up (both appear from prominent presses). As things stand, his book largely recapitulates what

¹MIT Press, 1999.

²Belknap Press/Harvard University Press, 2007.

they have already argued more eloquently. Furthermore, the idea of the "autogen," or self-generating system, which is the centerpiece of Deacon's argument, was already well explored by Francisco Varela, whose contribution to the field is also underacknowledged by Deacon. It is to be hoped that these scholarly lapses will be rectified by Deacon in future publications.

What about the ideas themselves? How cogent are they? Regarding the unoriginal ones, I would say that they are promising and potentially groundbreaking: the notion of a self-organizing system as a sui generis category for understanding the basis of purposive organic life and cognitive processes is certainly something worth pursuing. The need fully to accept the reality of mind and meaning, not eliminate them from our official scientific worldview, is also sensible and theoretically challenging. Facing up to the explanatory problem of accounting for emergence without assuming saltation, or unexplained leaps in evolution, and preformationism is salutary. But it must be said that when it comes to Deacon's own distinctive contributions the intellectual quality takes a sharp dive.

His central original thesis, much trumpeted and contained in the book's title, is that reality includes "absences" as well as "presences," and that these absences are part of the causal structure of the world. This is how he explains the idea:

Each of these sorts of phenomena—a function, reference, purpose, or value—is in some way incomplete. There is something not-there there. Without this "something" missing, they would just be plain and simple physical objects or events, lacking these otherwise curious attributes. Longing, desire, passion, appetite, mourning, loss, aspiration—all are based on an analogous intrinsic incompleteness, an integral without-ness.

He calls these "absential phenomena" and describes them as not "materially present." So, for Deacon, the key to understanding the emergence of life and mind is to recognize that nature has an inherently "incomplete" or "absential" character. He does not offer any rigorous treatment of the ontological standing of such putative "absences," puzzling as they are, but it is easy to see that he is conflating several quite separate ideas and characterizing them using distinct concepts.

It is quite true that thoughts and emotions can be about absent objects, existing elsewhere or even nonexistent, but they can also be about perfectly present and palpable objects—there is nothing absent when I point at my cat in front of me. Moral values, for their part, are not *about* things at all, present or absent—though they are not material entities (so they are not "materially present"). Possibilities are something else again, being nonactual, though they can be possibilities of material things—such as the possibility of my room being on fire. Purposes are inherently future-directed, but it is peculiar to call them "incomplete." For instance, I completely intend now to play tennis later today.

All that can be said to unify this

motley collection is that each item is apparently not part of actual physical reality, so each proves troublesome for materialist reductions. But things can be positively “present” (whatever this quite means) without necessarily being reducible to matter—for instance, one’s current sensation of redness. The notions of “absence” and “incompleteness” are just not apt ways of characterizing these nonmaterial phenomena. Deacon’s attempt to unify the nonmaterial class by the neologism “entional phenomena” merely names a heterogeneous bunch of things. His suggestion that recognizing the existence of “absentia” facts is analogous to the mathematician’s recognition of the number zero seems particularly wide of the mark: Why is the heart’s having the function of pumping the blood or my entertaining a thought about London anything like there being zero apples on my desk?

If you are wondering whether Deacon has something in mind like Sartre’s use of the concept of “nothingness” to characterize the essence of consciousness, as proposed in *Being and Nothingness*, then think again—he shows no awareness of that monumental phenomenological work on pure absence. The whole idea of “incomplete nature” is confused and unhelpful; the only sliver of truth to it is that physics is incomplete as a description of full reality, so that many realities are absent from it. Despite his aspirations to producing a new metaphysics, Deacon is clearly no metaphysician (he is a biologist and brain scientist, not a philosopher). Still less appealing is his contention that absences can be causally relevant to what happens in the world. For how can what is *not* there cause what *is* there?

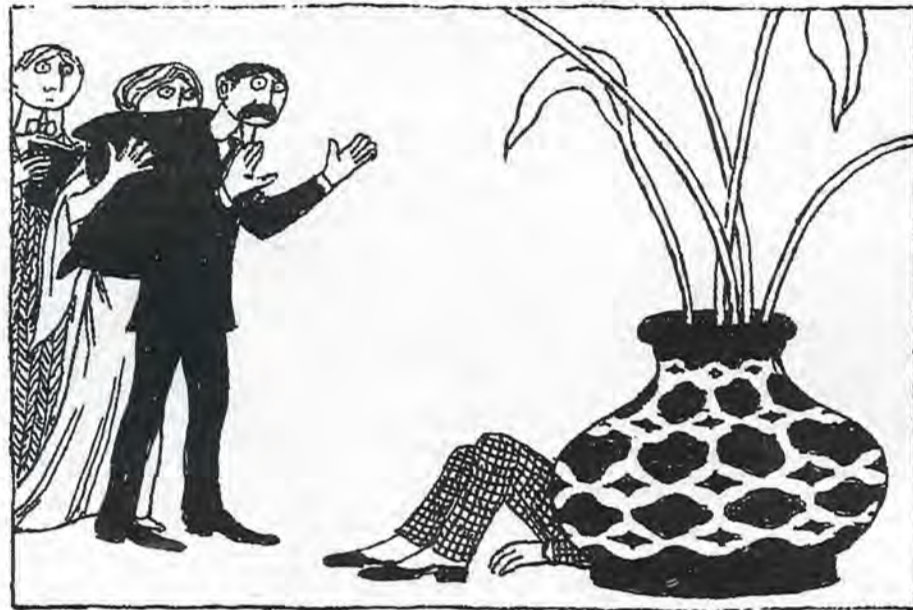
Deacon is vague on this question, but my suspicion is that he is confusing causation with explanation: my friend’s not being where I expect to find him might explain my leaving the place I am in, but it is surely preposterous to suggest that his not being there has the *causal power* to make me leave. His not being there is nothing like a strong smell of sulfur that might really have the causal power to make me leave. The nonexistent cannot cause something existent to happen (what do unicorns cause?). Fortunately, as the works cited earlier suggest, none of this weird ontology is necessary to underwrite the use of systems theory to explain the emergence of life and mind—though it is Deacon’s main claim to originality (I have certainly never heard such a view propounded before).

After laboring through 450 pages on physics, chemistry, and biology, we finally reach the part of the book promised by its subtitle, in which Deacon attempts in a mere eighty pages to dispatch the topics of the self, sentience, consciousness, and value. The result is bathetic and almost perfunctory: I suspect the author secretly realizes how flimsy and inadequate his suggestions are. The jargon mounts, the obscurity thickens, the cogency entirely flees. On the subject of the self—Descartes’s “I” that thinks—Deacon blithely insists that selves exist at far more primitive levels: there are bacterial selves, neural selves, cellular selves, and even termite colony selves.

This reasoning depends on a mere pun on the word “self”: true, such entities can be said to be *self-organizing*, but

it doesn’t follow that they are selves—any more than the self-identity of a rock shows it to be a self. Such entities as bacteria are indeed unified organisms, but nothing is gained in understanding the conscious human self by assimilating, as Deacon does, the latter to the former. Granted, conscious selves must have developed somehow from self-organizing unitary organisms, but *calling* both “selves” does nothing to explain such emergence. Sentences like the following shed no light on the question at hand:

The self-referential convolution of teleodynamics is the source of a special emergent form of self that not only continually creates its self-similarity and continuity, but also does so with respect to its alternative virtual forms.



Drawing by Edward Gorey

Buried in all this verbiage is a version of an old and discredited idea: that somehow the conscious mind emerges from a type of “self-modeling”—as if we get a real mental self only when a system can refer to itself. But many systems can be thus “self-referring” without being centers of conscious selfhood, e.g., computers that monitor their own operations—unless we build so much into the idea of “referring” that only selves can be said genuinely to refer. Certainly, no new ground is broken here.

Predictably, the treatment of sentience invites us to tolerate even more pointless punning, verbal stretching, and implausible assertion:

The central claim of this analysis is that sentience is a typical emergent attribute of any teleodynamic system. But the distinct emergent higher-order form of sentience that is found in animals with brains is a form of sentience built on sentience. So, although there is a hierarchic dependency of higher-order forms of sentience on lower-order forms of sentience, there is no possibility of reducing these higher-order forms (e.g., human consciousness) to lower-order forms (e.g., neuronal sentience, or the vegetative sentience of brainless organisms and free-living cells).

According to Deacon, then, there are “molecular, cellular, organismal, and mental forms of sentience,” and “neurons are sentient agents.” But it is not that he is an unrestricted panpsychist, holding that sentience is found everywhere in nature, since he does not

credit inanimate entities like atoms with sentience (awareness, consciousness, feeling); he restricts sentience to self-preserving dynamical systems.

But what could this mean? Does he really think that biochemical molecules have real sensations and feelings (but not the atoms that compose them)? What evidence is there for this supposition? Isn’t it just plain silly? Moreover, he accepts that the (real) sentience of whole organisms is not reducible to the (alleged) sentience of their cellular parts, so how can the latter *explain* the former? What we are confronted with here is the dogmatic and unfounded assertion that “sentience is constituted by the dynamical organization, not the stuff (signals, chemistry) or even the neuronal cellular-level sentience [!] that constitutes the substrate of that

being the originative locus of agency, our interior subjective isolation, and the sense of emerging out of nothing and being our own prime mover—all these core characteristics of conscious experience—are accurate reflections of the fact that the self is literally *sui generis*, emerging at each moment from what is not there.

What prompts Deacon to this preposterous statement is the confused idea that the organization of a system is “absent” because it is not the same as the stuff (“substrate”) that makes up the system. But nothing can literally emerge from nothing, and nothing does—the organization of a system is just as “present” as its material basis. And further, the explanatory gap that exists between conscious experience and the physical nature of the organism is not closed merely by observing that complex systems have teleological and self-organizing properties—as bacteria and liver cells clearly show. We still don’t see how mere self-organization can generate the subjective character of conscious experience.

The book ends on a sentimental note:

Despite the power and insights that we have gained from this powerful way of conceiving the world [i.e., natural science], it has not helped us to feel “at home in the universe.” Even as our scientific tools have given us mastery over so much of the physical world around and within us, they have at the same time alienated us from these same realms. It is time to find our way home.

dynamics.” This is Deacon’s answer to the so-called “hard problem” of consciousness, i.e., the problem of explaining how the conscious mind arises from insentient matter: it’s not the physical stuff that counts, for him, but “how this stuff is organized and related to other stuff.” But the organization and relatedness in question is shared by all biological systems, even individual cells, so consciousness must be everywhere in the biological world. And how *can* the causal and structural relations between the chemical stuff magically give rise to full-blown consciousness, when the stuff itself is impotent to do so?

Deacon must be aware of the extensive contemporary literature discussing the nature of this problem, but his proposals do nothing to answer the doubts that have been raised about reducing consciousness to chemistry—even chemistry conceived by way of dynamical systems theory. This is where we came in, and Deacon says nothing to advance the discussion. His true colors show when he asserts: “We *identified* [my italics] the experience of emotion with the tension and work associated with employing metabolic means to modify neural morphodynamics.” If that isn’t just a version of old-fashioned neural reductionism, I don’t know what is.

The triumphant conclusion to which Deacon is led by all this is expressed thus:

We are what we are not: continually, intrinsically, necessarily incomplete in our very nature. Our sense of self, our experience of

The way home, we are assured, is to recognize that “there is more than what is actual. There is what could be, what should be, what can’t be, what is possible, and what is impossible.” This is “what has been missing from our current blinkered metaphysical worldview.” Philosophers will smile wryly at these wistful remarks, recognizing that the realms of the possible and impossible, the normative, the teleological, the irreducibly mental, have been their province for lo these many years. That “our” that precedes “blinkered” does not include such dedicated metaphysical thinkers. Deacon evidently knows nothing of the standard fare of traditional and contemporary metaphysics, taking himself to be blazing a trail that is already much blazed and many miles wide. This seems a fitting conclusion to a strangely self-congratulatory, jejune, and infuriating book.

But let me end on a positive note. The book does have some virtues. It is about an important subject. It faces up to the explanatory challenges posed by the existence of life, mind, and meaning. The discussions of homuncular fallacies, computational models of cognition, information theory, and the notions of physical and mental work contain some solid (if familiar) points. A very dedicated reader might be able to extract some useful ideas from the dense and impenetrable prose. Unfortunately, the book’s vices vastly outweigh its virtues. I would instead recommend the works by Alicia Juarrero and Evan Thompson, cited earlier, to anyone wanting to understand complex systems theory and its potential contribution to biology, psychology, and philosophy. □