Review of: "Evolution, Through the Lens of a Physicist"

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Potential competing interests: No potential competing interests to declare.

On the "Evolution, Through the Lens of a Physicist" by Alfred Driessen

Comment by Gordana Dodig-Crnkovic, https://www.gordana.se/

My comment will focus on the claim:**"If a biologist believes that in the biological objects, a designer or even a creator becomes visible, he cannot invoke the natural sciences."** I will argue that for a natural scientist and contemporary natural philosopher, there is no reason to give up naturalism. On the contrary, naturalism today has the most promising perspectives.

Let me start with the examples given in the article, just in reverse order as I see the first as a consequence of the second.

1. "one of the fundamental philosophical issues:**whether the whole is more than the sum of its parts**"

I am surprised that the author treats this question as open.

Already Aristotle claimed that the whole is more than the sum of isolated parts, see:

https://se-scholar.com/se-blog/2017/6/23/who-said-the-whole-is-greater-than-the-sum-of-the-parts

But even more relevant in this context is

P. W. Anderson (1972) **More Is Different**, Science, Vol. 177, No. 4047, pp. 393-396.

https://cse-robotics.engr.tamu.edu/dshell/cs689/papers/anderson72more_is_different.pdf

The author refers to Anderson as leaving space for doubt in claiming "More Is Different".
I would interpret Anderson as indeed saying that *more is different*.

The difference between the system and the sum of its parts in isolation is the interactions between them. When you break a system into independent parts, you lose interactions. That is the difference.

If we agree on that, we can better see what follows.

(b) "…**whether a physicist can confirm or exclude the occurrence of chance in an event with his methods. If this is not possible, as will be shown below, serious doubts could arise about whether a biologist could do so."**

Biologists can tell the difference between intentional and unintentional behavior of living systems. More is different, and

biological systems are intentional, or more precisely, they possess the ability of intentionality. Michael Levin calls them “Darwin's agential materials”.

Levin M. (2023). **Darwin's agential materials: evolutionary implications of multiscale competency in developmental biology**. *Cellular and molecular life sciences: CMLS*, *80*(6), 142. https://doi.org/10.1007/s00018-023-04790-z

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10167196/

In the work of Michael Levin (biologist and interdisciplinary thinker), many answers to questions posed by the current article can be found.

Another author who answers the question of goal-directedness/intentionality in living systems is William B. Miller. See his book:

William B. Miller (2023) **Cognition-Based Evolution. Natural Cellular Engineering and the Intelligent Cell**, Routledge

https://www.routledge.com/Cognition-Based-Evolution-Natural-Cellular-Engineering-and-the-Intelligent-Cell/Miller/p/book/9781032261478?srsltid=AfmBOop2WBUOw_1_JN91eIfxRnpxmHxGfXDoZFzp60x2KeUm8tWwyQoP

https://www.researchgate.net/publication/370547009_Cognition-Based_Evolution_Natural_Cellular_Engineering_and_the_Intelligent_Cell pdf, book

Driessen states:

“The point was to consider whether physicists can make relevant contributions to a better understanding of evolution with the results of their discipline.”

Further:

“Section 2 examined the ability of a physicist's methods to distinguish chance or intent. It turned out that the statistical nature of the laws of nature on a microscopic scale makes this distinction fundamentally impossible. It is expected that biologists also miss the tools to make this distinction. In any case, no well-founded claim in the literature is known to the author. This consideration leads to an important conclusion: **If a biologist believes that in the biological objects, a designer or even a creator becomes visible, he cannot invoke the natural sciences.”**

The fact is, natural sciences are making new progress, especially in the field of biology, particularly developmental biology, bioinformatics, genetics, extended evolutionary synthesis, complexity, information, and computation studies applied to living systems, computational biology, and chemistry – to name just a few fields that are advancing towards a better understanding of life as a natural process in terms of natural sciences.

Here are a few recent books illustrating where we stand at the moment:

Corning, P. A., Kauffman, S. A., Noble, D., Shapiro, J. A., Vane-Wright, R. I., & Pross, A. (2023). **Evolution “On Purpose”: Teleonomy in Living Systems.** The MIT Press. https://doi.org/10.7551/mitpress/14642.001.0001

Philip Ball (2023) **How Life Works. A User's Guide to the New Biology.**Pan Macmillan https://www.amazon.com/How-Life-Works-Users-Biology/dp/0226826686

(Philip Ball is trained as a chemist and physicist)

Walker, S. I. (2024). **Life as No One Knows It** The Physics of Life's Emergence. Penguin Publishing Group.

(Sara Walker is a physicist with interests in the physics of life and complexity)

Article claims:

"At the same time, a comparison with physics and metaphysics would allow a sharper separation between evolution as science and evolution as a philosophical worldview (metabiology). "

Still, we haven't exhausted naturalistic scientific approaches. We are in a very intense period of growth of scientific knowledge. In the coming decades, especially with the help of new experimental and theoretical intelligent methods and tools, we will be able to even better understand those processes that lead to the complexification of matter that acquires properties of life. Contemporary philosophy of nature plays an important role in providing a broad unifying framework and perspective for this work. An interdisciplinary framework is essential, and diverse perspectives are necessary. Physicists are already involved in studies contributing to a better understanding of life, its development, and evolution.