



When nature inspires technology

Henry Dicks. The biomimicry revolution: learning from nature how to inhabit the earth. New York: Columbia University Press, 2023, 320 pp, \$35.00 HB

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One of the central themes of Western philosophical reflection has always been the relationship between technology, culture, and nature: Should technology imitate the forms of nature? Is technology a cultural praxis capable of improving the natural world? What validity and autonomy does the creativity of the technician have if nature is the starting point for engineering practices? In other words, is there a gap between nature and technology?

These questions have taken on a different meaning and profound relevance since the emergence of bio-inspired disciplines and their heyday in the twenty-first century. Disciplines such as biomimicry, bionics, biorobotics, and biodesign start from examining the structures of nature to develop new engineering artifacts based precisely on the very arrangements and properties of natural forms. From the design of these bio-inspired technologies, these disciplines then pursue various scientific or technoscientific goals (Tamborini and Datteri 2023; Tamborini 2021).

In his book *The Biomimetic Revolution: Learning from Nature How to Inhabit the Earth*, environmental philosopher Henry Dicks develops a broad reflection on the philosophical assumptions and potential benefits of studying recent bio-inspired disciplines. In particular, he focuses on biomimicry. Biomimicry is commonly understood as “the imitation (*mimesis*) of life (bios)” (IX) to produce “technological innovation, albeit one oriented toward sustainability” (250).

The classic example of biomimicry research is the design of Velcro. The Swiss engineer George de Mestral created this object by taking a cue from the structure by which the burdock thistle attaches itself to the fur of passing animals and then transferring it to the engineering level (<https://Biomimicry.Org/What-Is-Biomimicry/2023>).

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Dicks' philosophical agenda follows the classical definition of biomimicry. He identifies the emergence of bio-inspired disciplines, and biomimicry in particular, as a revolution not only in engineering science and in the method and approach of philosophy, but also (and especially) in "radical changes to human being, producing, acting, and knowing" (250). Following this revolutionary spirit, Dick's book aims to be "not so much a philosophy of biomimicry, understood as an attempt at sustained philosophical reflection on the subject of biomimicry, as an exposition and development of biomimicry, understood as a new philosophy." (250).

The author's starting point is the methodological foundation of biomimicry proposed by American scientist Janine M. Benyus. In her classic text, Benyus defines the goals of biomimicry by stating that this discipline looks at nature from three different perspectives. First, nature is seen as a model that tells us how to make something. Second, nature is seen as a measure, providing standards by which to judge artistic production inspired by nature. Third, nature is seen as a mentor, in that it is the source of truth for artistic and technical production (Benyus 1997).

Building on these three methodological assumptions, Dicks develops a new philosophy of biomimicry in four well-written and philosophically dense chapters. These examine in-depth the 'nature of nature' (Chapter 1), nature as model (Chapter 2), nature as measure (Chapter 3), and nature as mentor (Chapter 4). These chapters reflect the classical, fundamental Aristotelian branches of philosophy that Dicks addresses (and redefines) as a result of the biomimicry mode of production. These are, respectively, the ontological status of nature (Chapter 1), the question of what is biomimetic technics (Chapter 2), the foundation of a new biomimetic ethics (Chapter 3), and the new biomimetic epistemology that emerges from treating nature as a mentor (Chapter 4). In short, Dicks asserts that concerning the new philosophy derived from biomimicry, it is "to the creative renewal of four Greek words—*physis*, *technē*, *ethos*, and *epistēmē*—that we must look if we are to provide the biomimicry revolution with the philosophical foundations it requires" (15). Accordingly, he concludes, "Philosophy ... is primarily thinking about being (ontology), and secondarily thinking about making and producing (technics), right action (ethics), and knowledge (epistemology)" (8).

In the few pages available here, it is almost impossible for me to restate the theses and arguments that Dicks develops in the different chapters. To reimagine the core tenets of philosophy through the prism of the biomimicry revolution, the author traverses a diverse array of subjects: encompassing the nature of autopoiesis, the creative imitation of natural forms, the composition of bio-technological structures, the realm of ethical understanding within biomimicry, the various levels of abstraction integral to this discipline, etc.

One fundamental thesis, however, deserves critical attention: Dicks' rehabilitation of ontology and his consequent plea for a genuine philosophical inquiry into being or nature for grounding a new ontology.

As mentioned above, the philosophical step that Dicks invites us to take to found a new philosophy based on biomimicry is based on a well-defined historical line of thought. On the one hand, he advocates a return to Aristotle and, on the other, a return to Martin Heidegger's philosophy. From these historical-philosophical

assumptions, Dicks develops his vision of bioinspired science and environmental philosophy.

Embracing the philosophies of Aristotle and Heidegger, including their perspectives on (bio)technique, while occasionally subtly and at times explicitly challenging an alternative philosophical tradition rooted in thinkers such as Immanuel Kant, Ernst Cassirer, Hans Blumenberg, and other continental scholars, Dicks constructs his philosophical framework centered around the concept of ontology: “Ontology ... is not just another area of philosophy, but rather its very foundation, for it is from this foundation that all other areas branch out” (6).

In this decidedly anti-Kantian perspective, ontology is regarded as distinct from epistemology. Put simply, the inherent nature of the world remains entirely uninfluenced by our methods of understanding it (and our design of bioinspired objects). According to Dicks, the essence of nature is fundamentally separate from scientific procedures. However, this metaphysical standpoint, rooted in the teachings of Aristotle and Heidegger as per Dicks, carries two potential pitfalls.

Firstly, there is what I term a metaphysical trap. By redefining ontology in this way, there is a potential danger of getting caught up in the realism/anti-realism debate, and thus getting entangled in complicated (and very slippery) metaphysical issues similar to those espoused by proponents of the new realism (Gabriel 2014; Ferraris 2014; Cardani and Tamborini 2017). In accordance with this, Dicks aligns himself with the notion that philosophy can establish the ontological realm independently of the epistemological realm.

Second, with the autonomy of ontology from epistemology, Dicks does not delve deeply into explaining the practices of biomimicry. This differs from the more recent philosophy of science in practice, which emphasizes the actions of scientists and the analysis of their methodologies. In this context, reality is meant as mind-framed and not mind-controlled (Chang 2012; 2022; Tamborini 2022a; Massimi 2022; Tamborini 2022b; Rheinberger 2011).

Furthermore, there is a profound (categorical) difference between bio-inspired science (e.g., biomimicry), its object, and nature. As the German philosopher Ernst Cassirer notes, science is a doing, and “the analysis of this doing must be carried out with completely different criteria and categories than the analysis of nature;” biomimicry “does not belong to the world of things” (Cassirer 2011, 212).

The challenge then becomes how to construct an ontological argument about the development of bio-inspired engineering that avoids any potential entanglement in categorical confusion and metaphysical traps while at the same time duly acknowledging the active and practical dimension inherent to science. Within this framework, it becomes imperative to thoroughly explore the dynamic interaction between ontology and epistemology in order to gain a tangible understanding of how the transition between these spheres can feasibly be achieved.

To conclude, Dicks has written a valuable book that offers much food for thought in understanding what bio-inspired disciplines are and how we can shape the future of the planet. He has the merit of offering a philosophical program without falling into the pitfalls of both “naïve instrumentalism” (conceiving technology as merely a tool) and “uncritical posthumanism” (viewing technology as quasi-“others”) (Coeckelbergh 2022). Notably, the book concludes with a strong call for a new

phase of enlightenment: a much-needed one in human history in which “humans realize that their aspirations to autonomy were premature, that they remain dependent on another, on nature” (255). I warmly recommend this book.

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