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INTRODUCTION: THE DEFINITION OF LIFE

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Abstract

In this special issue of BioCosmos, we address the problem of the definition of life. If we assume that biology is a genuine science, with its own distinctive subject matter, then there must be a real distinction between living and non-living things. We are concerned not merely with the meaning of the word 'life' or with merely clarifying our biological concepts, but with uncovering what it is (if anything) in the world that unifies the domain of living things and separates it from the rest of the cosmos. Six distinguished philosophers have contributed their answers to this problem.

Keywords

definition of life • philosophy

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The ancient Greek philosopher Aristotle is generally known as the father of biology, and he, following the lead of Socrates and Plato, was especially concerned with offering real definitions of categories of things. So, it is not surprising that three of our contributors, Marie George, Edward Feser, and Benjamin Koons, offer answers to our question that rely on the philosophical framework introduced by Aristotle. George focuses on the idea of *self-motion*. A living thing is something that *moves itself*, while non-living things are exclusively moved by other things. The notion of motion or moving deployed here (*kinesis* in Greek, *motu* in Latin) is not limited to locomotion (change of place) but embraces all kinds of change. According to George, what is both common to all living things and limited to them is the capacity to initiate change in themselves in ways that are *responsive to* but not *determined by* external stimuli.

Feser focuses instead on the idea that living things are *self-perfective* in nature. He argues that reproduction is only one way in which living things perfect themselves: plants perfect themselves by engaging in photosynthesis, animals by sensing their environment and moving appropriately, and human beings by reasoning and deliberating. Aristotle explicitly allows for the possibility of a non-mortal and hence non-reproducing living thing, so long as it actively pursues its own perfection (as determined by its essence). This notion of self-perfection is explicitly teleological in character. Feser argues that contemporary attempts to define life in terms of reproduction, and to explain the nature and origin of reproduction in terms of natural selection, fail catastrophically, forcing us to acknowledge the irreducibly teleological character of life.

Koons takes quite a different tack, arguing that Aristotle must deny that life has a definition, strictly speaking. This is not because there is no deep, metaphysical difference between living things and other substances but because of the essential diversity of life. Aristotle denies that plant life, animal life, and human life are three varieties of the same thing (generic *life*), falling under a single definition and belonging to a single genus. Rather, the relation among the three is *analogical*. The three domains form a hierarchy or series, with higher forms of life including something analogous to the lower forms within themselves. That life is indefinable follows from Aristotle's very strict notion of what counts as a definition. Where there are relations of priority, with some forms definable in terms of others (as, e.g., in ancient geometry pentagons are definable in terms of triangles), the forms cannot share a common definition

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or belong to the same genus. Since animal life depends essentially on the functions characteristic of plant life, but not vice versa, we cannot think of animal and plant lives as two varieties of the very same thing. Koons draws the further conclusion that the function of nutrition, which for Aristotle is both common and unique to living things, must be defined in terms of 'parochial' features shared by actual living things on Earth (including the particular chemical composition of living cells).

David Oderberg, although very sympathetic to the sort of Aristotelian investigation of the real definition of life pursued by George and Feser, offers instead an *operational* definition of life in his contribution. An operational definition gives us a set of criteria (jointly sufficient and individually necessary) for distinguishing living things from non-living things, without necessarily giving us the essence of life, that is, without telling us what it is to be alive. Oderberg's operational definition employs the notion of a *mistake*. Living things can make mistakes, but nothing non-living can be mistaken. Oderberg and Feser are in agreement that there is something unavoidable about characterizing living things in terms of teleology, that is, in terms of what they are *supposed to do*. And one could argue that this is also true of George, since a process of self-motion would seem to presuppose an end or goal toward which living things propel themselves.

Janice Chik Breidenbach addresses a potential problem within the Aristotelian framework defended by George, Feser, Oderberg, and Koons, namely, the problem of abiogenesis. If life can be defined as something fundamentally different from non-living things, how is it possible that living things could arise in a world originally devoid of life? Breidenbach urges Aristotelians to embrace a surprising solution to this difficulty – that of Vital Elementalism, the view that every natural substance is alive. This means, of course, that the task of defining life is simply the task of defining natural substance in general, there being now no distinction between living and non-living substances. Breidenbach does not entail that every material *thing* is alive: some material things may be mere *fragments* of living things, or mere *heaps* of such living things and fragments of them. However, the sum of all living things comprises the entire material universe, without remainder. The emergence of the kinds of organisms that we ordinarily characterize as living is on this view the result of a process of 'cosmic fission', with ordinary biological organisms becoming separated from a single, living cosmos.

John Dupre, in contrast to the other contributors, approaches the question in a way that is independent of the Aristotelian programme. Following Wittgenstein, Dupre is skeptical of the possibility of offering any definition of ordinary terms like 'life'. That is, he doubts whether there is a set of conditions both necessary and sufficient for life. Instead, he offers a single necessary condition: *processuality*. Following in the process philosophy tradition of Alfred North Whitehead, Dupre argues that living organisms should be identified as processes rather than as enduring things (or substances, in Aristotelian terms). According to Dupre, an enduring thing (in contrast to a process) should be autonomous, stable, and well-bounded, characteristics lacking in living organisms. Even more importantly, Dupre argues that living things do not possess any essential properties that endure throughout the many changes characterizing a life cycle. In effect, Dupre illustrates the result of rejecting the sort of teleological conception of biological essence shared by George, Feser, Koons, and Oderberg.