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Can Scientific Practice Inform Metaphysics?
Title: What are Holobionts? - A Case Study for Hard Questions About Biological Individuality
Abstract:

The problem of how to define and identify individuals has been a recurring issue throughout the history of philosophy, often tightly linked to the biological sciences. Many early writers (e.g., Aristotle and Locke) used organisms as models to better understand what an individual in general is. Two competing approaches developed in contemporary work. In 20th century analytic philosophy the problem has often been considered from a more general metaphysical point of view (e.g. Strawson and Wiggins), relatively removed from particular cases. In sharp contrast, the approach in the philosophy of science has been to start by focusing on the ontological status of a circumscribed group of entities, and then (occasionally) to build out to a more general account. I will focus on this second approach, asking what constraints biology might put on broader theories of individuality.

In the last few decades, biologists and philosophers of biology have worked towards finding biological criteria for the individuation of biological entities, as opposed to earlier approaches based on the "phenomenal individuation" of organisms using categories derived from more familiar things, such as vertebrate animals and large plants. This has resulted in some of the most active debates within philosophy of biology. Debates such as: whether biological individuality is unified, or whether it is particular to a domain of study or the question being asked, whether it is hierarchical or multilevel, whether it comes in degrees, and whether all accounts of biological individuality have to be grounded in biological theory. There is now a rough consensus that there are at least two broad facets to biological individuality. Opinion on whether they can be conjoined into a more general account is more divisive. Evolutionary individuals are defined as those entities involved in the process of evolution by natural selection. It is argued that evolutionary theory is the most powerful and comprehensive theory of biology, and so our best tool to say what a biological individual is. In contrast, physiological individuality takes organisms—roughly, cohesive and unified metabolic entities with mutually dependent and functionally integrated components—as a given, and then tries to pick out which processes produce them, and which criteria delineate them.

All macroscopic animals, plants and fungi can be redescribed as holobionts—defined as an organismal host and all its associated microbiota. Holobionts are an interesting case study for individuality because most of them share features with organisms, communities, and ecosystems. The interactions between holobiont partners span the continuum between converged individuals, functionally integrated wholes, and ecological relations. I will explore some of the details of holobiont biology and use them to interrogate a range of alternative conceptions of biological individuality. I will argue that multiple conceptions of individuality are needed to make sense of holobiont behavior and evolution. I will conclude by suggesting how we should understand the problem of individuality more generally, given the ubiquity of holobionts, and the fact that they are the default state of macroorganismal life.