

JACK WILSON

Biological Individuality

The Identity and Persistence of Living Entities



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Biological Individuality

In this book, Jack Wilson brings together two lines of research, theoretical biology and analytic metaphysics, that have dealt with the individuation of living entities in virtual isolation from one another. Wilson presents a new theory of biological individuality that addresses problems that cannot be solved by either field alone. The wide range of unfamiliar and fascinating organisms that he uses to develop his view, including slime molds, parasitic barnacles, and tardigrades, enables him to escape the limitations of theories based on thought experiments and the timeworn examples of organisms on which philosophers have traditionally relied. He presents a more fine-grained vocabulary of individuation based on diverse kinds of living things. This allows him to clarify and resolve previously muddled disputes about individuality in biology and philosophy.

This is a clearly written book of interest to philosophers of biology, metaphysicians, and biologists.

Jack Wilson is Assistant Professor of Philosophy at Washington and Lee University.

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Washington and Lee University



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For Marjorie

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Beyond Horses and Oak Trees

A New Theory of Individuation for Living Entities

A main cause of philosophical disease – a one sided diet: one nourishes one’s thinking with only one kind of example.

Ludwig Wittgenstein

1.1 INTRODUCTION

Past attempts to explain how to individuate living things have failed for two reasons. They have not assimilated a full range of biological examples or they have been misled by the most common examples and thought experiments. In this book, I explore and resolve paradoxes that arise when one applies past notions of individuality to biological examples beyond the conventional range. I also present a new analysis of identity and persistence.

My argument is based on the belief that to answer the philosophical question “What is a living individual?” it is necessary to find a satisfactory solution to the question “What should a population biologist count when she counts organisms?” Both questions seem to have clear answers when we consider stock examples. Under normal circumstances we can count the number of puppies in a litter or tomato plants in a garden. However, the same intuitions that allow us to count puppies and tomato plants with confidence leave us perplexed when we try to count colonial siphonophores like the Portuguese man-of-war. Things get strange when we extend folk notions of individuality beyond folksy uses. We can find cases in which criteria of individuation for living things that we are used to seeing hang together give contradictory answers to the question “Is it an individual?” If we take the word ‘individual’ to be synonymous with ‘particular,’ there will not be many questions at the level of the organism and below (though there may be confusion about the nature of species). But traditionally the term ‘individual’ has been used more broadly, and in this work I explore many of these uses as they

relate to organic organization, genetics, development, and models of natural selection.

The theories of individuation generated by considering only a narrow and conventional range of examples prove inadequate when applied to real living things whose normal modes of existence include complex metamorphoses, regeneration of lost parts, splitting apart and fusing together. A clonal population of the fungus *Armillaria bulbosa* occupies at least fifteen hectares in a Michigan forest. Some mycologists have called it the largest individual living thing on earth. What are the grounds for this claim? Some species of rhizocephalans, a group of parasitic barnacles, have several distinct developmental phases. Is each phase a separate individual or do they collectively compose an individual? Strawberries can reproduce through sexual or clonal reproduction. Is each clone an individual or does the entire set of clones compose an individual? Or are both individuals? Questions like these cannot be answered satisfactorily by a theory that treats the characteristics of a higher animal as the necessary and sufficient conditions of individuality. In fact, cases like these raise the question of whether there are necessary and sufficient conditions for individuality *simpliciter*.

In answering these questions I will address others. What makes a biological entity an individual as opposed to a colony or a component of a larger individual? What criteria should we use to determine that a biological entity – for example, a colony of termites or an asexual organism – is the same colony or organism as one that existed at a previous time? In metaphysical terms, what biological (or other) processes cause substantial change?

In this chapter, I show that past philosophers have failed to explicate the conditions an entity must satisfy to be a living individual. I then explore the reasons for this failure and explain why we should limit ourselves to examples involving real organisms rather than use thought experiments.

1.2 THE MEANING OF ‘A LIFE’

Many philosophers assume that it is easy to individuate living things. In this section I present a pair of examples. John Locke claims in the second edition of *An Essay Concerning Human Understanding* that a plant or animal need not be composed of exactly the same particles of matter throughout its existence. A living thing’s persistence is not contingent on its particular material constitution. Instead, the continuation of a life preserves the identity of an organism through the flux of material constituents.

In the state of living Creatures, their Identity depends not on a Mass of the same Particles; but on something else. For in them the variations of great parcels of