

CONTEMPORARY
DEBATES
IN PHILOSOPHY

CONTEMPORARY DEBATES IN
**PHILOSOPHY
OF BIOLOGY**

EDITED BY FRANCISCO J. AYALA
AND ROBERT ARP

Contemporary Debates in Philosophy of Biology

Edited by

Francisco J. Ayala and Robert Arp

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Contemporary Debates in Philosophy of Biology

Contemporary Debates in Philosophy

In teaching and research, philosophy makes progress through argumentation and debate. *Contemporary Debates in Philosophy* provides a forum for students and their teachers to follow and participate in the debates that animate philosophy today in the western world. Each volume presents pairs of opposing viewpoints on contested themes and topics in the central subfields of philosophy. Each volume is edited and introduced by an expert in the field, and also includes an index, bibliography, and suggestions for further reading. The opposing essays, commissioned especially for the volumes in the series, are thorough but accessible presentations of opposing points of view.

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Contents

Notes on Contributors	ix
General Introduction	1
References and Further Reading	7
PART I IS IT POSSIBLE TO REDUCE BIOLOGICAL EXPLANATIONS TO EXPLANATIONS IN CHEMISTRY AND/OR PHYSICS?	13
Introduction	13
References and Further Reading	15
1 It Is Possible to Reduce Biological Explanations to Explanations in Chemistry and/or Physics <i>Evelyn Fox Keller</i>	19
2 It Is Not Possible to Reduce Biological Explanations to Explanations in Chemistry and/or Physics <i>John Dupré</i>	32
PART II HAVE TRAITS EVOLVED TO FUNCTION THE WAY THEY DO BECAUSE OF A PAST ADVANTAGE?	49
Introduction	49
References and Further Reading	51
3 Traits Have Evolved to Function the Way They Do Because of a Past Advantage <i>Mark Perlman</i>	53
4 Traits Have Not Evolved to Function the Way They Do Because of a Past Advantage <i>Robert Cummins and Martin Roth</i>	72

PART III ARE SPECIES REAL?	87
Introduction	87
References and Further Reading	88
5 Species Are Real Biological Entities <i>Michael F. Claridge</i>	91
6 Species Are Not Uniquely Real Biological Entities <i>Brent D. Mishler</i>	110
PART IV DOES SELECTION OPERATE PRIMARILY ON GENES?	123
Introduction	123
References and Further Reading	125
7 Selection Does Operate Primarily on Genes: In Defense of the Gene as the Unit of Selection <i>Carmen Sapienza</i>	127
8 Selection Does Not Operate Primarily on Genes <i>Richard M. Burian</i>	141
PART V ARE MICROEVOLUTION AND MACROEVOLUTION GOVERNED BY THE SAME PROCESSES?	165
Introduction	165
References and Further Reading	166
9 Microevolution and Macroevolution Are Governed by the Same Processes <i>Michael R. Dietrich</i>	169
10 Microevolution and Macroevolution Are Not Governed by the Same Processes <i>Douglas H. Erwin</i>	180
PART VI DOES EVOLUTIONARY DEVELOPMENTAL BIOLOGY OFFER A SIGNIFICANT CHALLENGE TO THE NEO-DARWINIAN PARADIGM?	195
Introduction	195
References and Further Reading	197
11 Evolutionary Developmental Biology Offers a Significant Challenge to the Neo-Darwinian Paradigm <i>Manfred D. Laubichler</i>	199
12 Evolutionary Developmental Biology Does Not Offer a Significant Challenge to the Neo-Darwinian Paradigm <i>Alessandro Minelli</i>	213
PART VII WERE THE BASIC COMPONENTS OF THE HUMAN MIND SOLIDIFIED DURING THE PLEISTOCENE EPOCH?	227
Introduction	227
References and Further Reading	228
13 The Basic Components of the Human Mind Were Solidified During the Pleistocene Epoch <i>Valerie G. Starratt and Todd K. Shackelford</i>	231

14 The Basic Components of the Human Mind Were Not Solidified During the Pleistocene Epoch <i>Stephen M. Downes</i>	243
PART VIII DOES MEMETICS PROVIDE A USEFUL WAY OF UNDERSTANDING CULTURAL EVOLUTION?	253
Introduction	253
References and Further Reading	254
15 Memetics Does Provide a Useful Way of Understanding Cultural Evolution <i>Susan Blackmore</i>	255
16 Memetics Does Not Provide a Useful Way of Understanding Cultural Evolution: A Developmental Perspective <i>William C. Wimsatt</i>	273
PART IX CAN THE BIOLOGICAL SCIENCES ACT AS A GROUND FOR ETHICS?	293
Introduction	293
References and Further Reading	295
17 The Biological Sciences Can Act as a Ground for Ethics <i>Michael Ruse</i>	297
18 What the Biological Sciences Can and Cannot Contribute to Ethics <i>Francisco J. Ayala</i>	316
PART X IS THERE A PLACE FOR INTELLIGENT DESIGN IN THE PHILOSOPHY OF BIOLOGY?	337
Introduction	337
References and Further Reading	340
19 There Is a Place for Intelligent Design in the Philosophy of Biology: Intelligent Design in (Philosophy of) Biology: Some Legitimate Roles <i>Del Ratzsch</i>	343
20 There Is No Place for Intelligent Design in the Philosophy of Biology: Intelligent Design Is Not Science <i>Francisco J. Ayala</i>	364
Index	391

General Introduction

Who Is This Book For?

This book features current research by scholars doing work in the central areas of philosophy of biology. Further, the papers are presented in a debate style with *yes* and *no* responses—often qualified—to basic questions posed in this continually developing sub-discipline of philosophy. This being the case, this book is ideal as (1) a stimulus for students in philosophy of biology and biology classrooms, as well as (2) a reference work for scholars who are working in this exciting field.

What Is the Philosophy of Biology?

The word “philosophy” comes from two Greek words: *philos*, meaning “love,” and *sophos*, meaning “wisdom.” Love here means something like an intense desire for something, while wisdom is arguably a kind of knowledge gained from experience, whether this be practical experience (gained from living life with all of its ups and downs) or theoretical experience (gained from understanding, evaluating, critiquing, and synthesizing ideas, positions, and concepts). Ever the theoretician, the philosopher has always been the person who not only desires to look deeper into some claim, idea, argument, event, or state of affairs by questioning assumptions and challenging status quo thinking, but also attempts to broadly explain and systematize aspects of reality (also see Craig, 2002; Pojman, 2007). In Bertrand Russell’s (1912/1999) words, which are appropriate given the nature of this book: “Philosophy, like all other studies, aims primarily at knowledge. The knowledge it aims at is the kind of knowledge which gives unity and system to the body of the sciences, and the kind which results from a critical examination of the grounds of our convictions, prejudices, and beliefs” (p. 9).

The word “biology” comes from two Greek words as well: *bios*, meaning “life,” and *logos*, meaning “word,” “rational account,” or “science.” Thus, biology is the kind or type of science that studies life, which most of us already know. Whereas *biology*

can be characterized as a set of sub-disciplines (the biological or life sciences) under science, the concern of which includes the description, classification, analysis, explanation, prediction, and ultimately control of living things (Audesirk, Audesirk, & Byers, 2008; Campbell & Reece, 2007), *philosophy of biology* can be characterized as a sub-discipline of philosophy—complete with topical subject-matter to be discussed momentarily—the concern of which is the meta-levelled attempt on the part of philosophers, biologists, and other thinkers to understand, evaluate, and critique the methods, foundations, history, and logical structure of biology in relation to other sciences, disciplines, and life endeavors so as to better clarify the nature and purpose of biological science and its practices (see Hull & Ruse, 2007; Rosenberg & Arp, 2009; Rosenberg & McShea, 2007; Ruse, 2008; Sarkar & Plutynski, 2008).

The Classification of Biology and Philosophy of Biology

Concerning the classification of biology within the general discipline of science, it is usually envisioned as a natural, empirical, pure science, as we illustrate in Figure 0.1 (also see Sadava, Heller, Orians, Purvis, & Hillis, 2008; Silberberg, 2008; Tippens, 2007). We are aware that what is represented in the figure is a partial taxonomy, and that there may be other ways to classify the sciences.

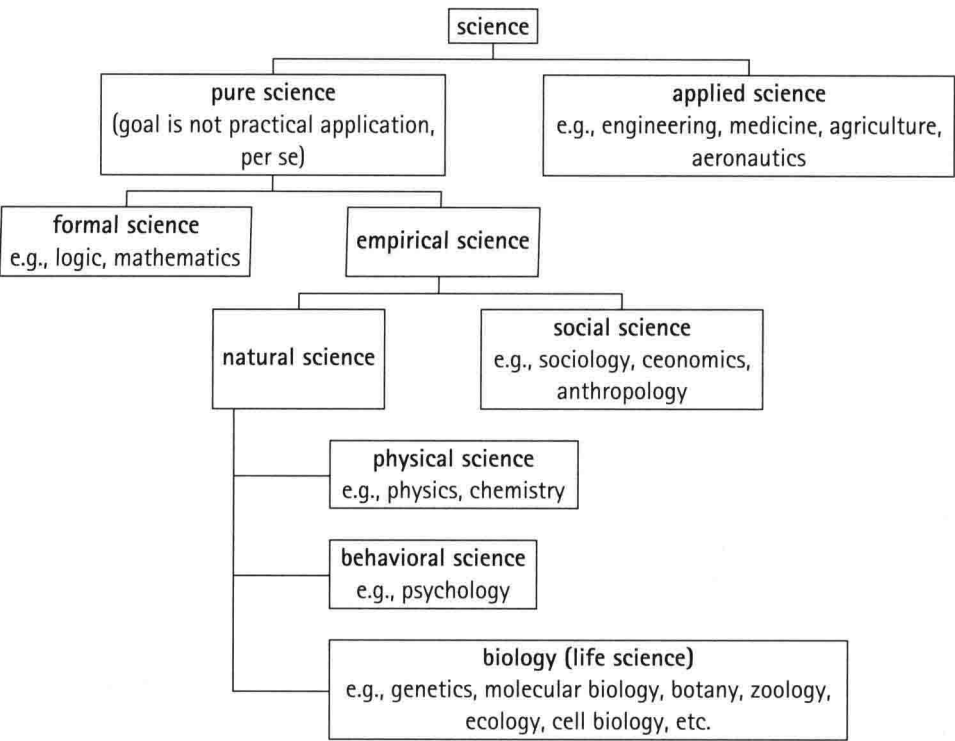


Figure 0.1: A basic classification of biology as a science

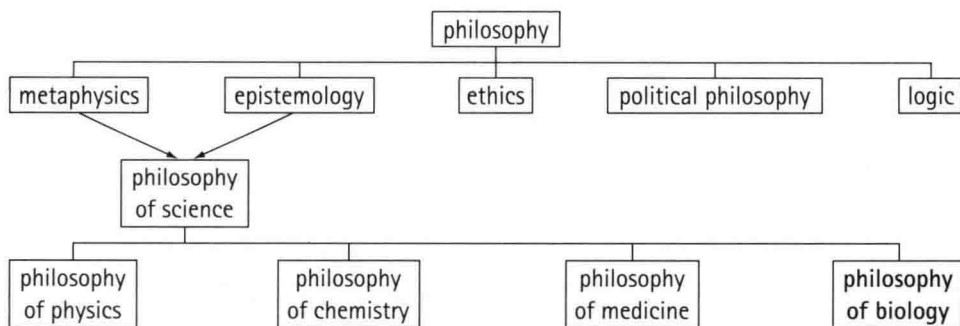


Figure 0.2: Philosophy of biology classified

Concerning the classification of philosophy of biology within the general discipline of philosophy, it is usually envisioned as a sub-discipline of philosophy of science, along with others like philosophy of physics, philosophy of chemistry, and philosophy of medicine. Because it concerns not only what kinds of things exist (*metaphysical* parts, processes, principles) as well as how we can know these things (*epistemological* perceptions, models, beliefs, justifications), the classification of philosophy of science itself can be considered a hybrid under metaphysics and epistemology; although, of course, this is debatable (Godfrey-Smith, 2003; Newton-Smith, 2001). Figure 0.2 represents a partial taxonomic classification of philosophy of biology, and we are aware that there are many other philosophical disciplines and sub-disciplines not shown, as well as that it is possible to classify the discipline of philosophy by historical time-periods or major movements (Copleston, 1994; Jones, 1997; Solomon, 2005).

The Relationship between the Biologist and the Philosopher

There are many biologists who think philosophically, and there are many philosophers who think like biologists, and this has always been the case in Western history since these two disciplines began coexisting with one another. In fact, researchers in these two disciplines have been able to assist one another in advancing ideas, putting issues to rest once and for all, and overthrowing faulty paradigms, as well as furthering technological comforts, establishing moral codes, and alleviating pain and disease (National Research Council, 1996, 2000; Watson & Arp, 2008).

A universally known example of this relationship between biology and philosophy is Charles Darwin (1809–1882), the field biologist and scientific naturalist, thinking like a philosopher of biology by mounting his self-proclaimed “one long argument” for natural selection in his famous work titled *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1859/1999). In line with our descriptions of philosophy and philosophy of biology put forward above, Darwin definitely challenged status quo thinking with natural selection and offered a meta-level analysis, explanation, and systematization of the biosphere. Darwin’s contemporaries even referred to him as a philosopher (Schad,

2004, p. 9). There is a famous paper by Theodosius Dobzhansky (1900–1975) titled “Nothing in Biology Makes Sense Except in the Light of Evolution” (1973) and it is obvious that, were it not for Darwin’s philosophy of biology-like thinking and theorizing concerning natural selection and evolution, the biological sciences would be foundationless today.

Just as many biological conundrums have been aided by philosophical thinking, so, too, many philosophical problems have been either solved or enlightened with the help of the biological sciences. Let us focus on one example. In philosophy of mind, *substance dualism* is the belief that a person is made up of two fundamental things—a material or physical body and an immaterial or non-physical mind/soul/spirit—that can exist apart from one another. Those who believe in the immortality (or reincarnation) of the soul are substance dualists because they think that the death of the body does not mean the death of the soul (for example, *Catechism of the Catholic Church*, 1994; also Baker & Morris, 1996). The soul lives on as a separate substantial thing after the death of the body, which is another, distinct, separate substantial thing. A lot of people on the planet are substance dualists of one sort or another, probably because of their religious upbringing (Morgan & Laungani, 2005). Think of the cartoons where a character gets killed and the body stays flat on the ground while the soul/mind/spirit/immaterial substantial part leaves the body and ascends into a heavenly world—this is straight-forward mind-body substance dualism.

Contemporary discussions of religious and non-religious forms of substance dualism in Western history usually trace their roots back to the famous Modern philosopher, René Descartes (1596–1650) (Descartes, 1998; see also Baker & Morris, 1996), but forms of substance dualism can be found in the history of Western philosophy in the twentieth century and back through Aquinas (1225–1274) to Augustine (354–430), Plotinus (ca. 204–270), Aristotle (384–322 BCE), and Plato (ca. 428–348 BCE) (Foster, 1991; Aquinas, 1949; Augustine, 1991; Plotinus, 1992; Aristotle, 1995; Plato, 1997). In fact, the cartoon character rendition of the soul leaving the body is very close to what people actually believed in most Western societies throughout the history of Western civilization. The histories of Eastern and Middle Eastern philosophy are also peppered with beliefs in various forms of substance dualism (Abramson & Kilpatrick, 1995; Hook, 1963; Knapp, 1992).

Now, here is where *neurobiology* has made important contributions to the philosophy of mind, and our thinking concerning substance dualism. First, it seems that the mind is, at best, an emergent or supervenient *property* that is the result of brain states; it may not be reducible to brain states, but it is certainly dependent upon brain state processes (Baars & Newman, 2001; Bisiach, 1999; Gold & Roskies, 2008; Hardcastle, 2007; Kim, 2000, 1999, 1995). If there is any doubt about this, one need only peruse any textbook or journal devoted to the human brain’s workings and read about the effects of brain damage upon the psychology of a person (see Bear, Connors, & Paradiso, 2006; Kandel, Schwartz, & Jessell, 2000). For example, without the normal functioning of the prefrontal cortex, individuals are not able to make plans, nor are they able to carry out the behavior necessary to fulfill those plans (Fuster, 1997; Passingham, 1993). Also, as Finke (1980) demonstrated many years ago, damage to the prefrontal cortex causes a person to be unable to store short-term memories. Further, damage to the limbic system can cause certain autisms and other emotional dysfunctions (Bauman & Kemper, 1994).

Given the influence and preponderance of neurobiological data, and the fact that no one has ever witnessed a soul leaving a body or existing in some other “state”—both indicating the fact that, no brain, no mind—many philosophers and other thinkers who still think that there is something special about the mind and mental capacities have opted for forms of *property dualism* in place of substance dualism. According to property dualism, a person is *one substance* that is made up of two wholly distinct features, characteristics, or properties: an immaterial mental property (the mind and mental states) and a material bodily property (the brain and neurobiological states). On this view, the mind and brain are distinct properties of some one person, similar to the way *roundness* and *blackness* are distinct properties found in the one period at the end of this sentence. Just as we can distinguish the property of roundness from the property of blackness in some one period, so, too, we can distinguish an immaterial mental property from a material bodily property in some one person.

However, just as the roundness and blackness of that particular period can exist only while that particular period exists, so, too, according to property dualists, the mental and bodily properties of a person can exist only while that person is alive. So when we delete the period, the properties of roundness and blackness in that particular period cease to exist along with the period. Likewise, when a person dies, both that person's body and mind cease to exist (no brain, no mind). Such a view of mind in relation to body seems to be consistent with neurobiological and other scientific data, and is appealing to those who do not believe in the immortality or reincarnation of the soul.

There is another possibility, namely, that the mind and mental states are completely illusory notions and all that really takes place when one thinks, decides, calculates, feels, believes, and the like, consists solely of neurobiological parts, processes, and principles. Thus, there is neither mental substance nor mental property, just brain and various brain functions. Given the influence and success of neurobiology—as well as the influence and success of physics, cognitive science, and artificial intelligence—many famous living philosophers, such as Paul Churchland (1989), Daniel Dennett (1990), and Jerry Fodor (2001), hold to this materialistic or physicalistic view of mind/brain. There are other positions concerning the nature and existence of mind that have come about as a result of the interaction of philosophy with the various life and behavioral sciences (see Heil, 1998; Lowe, 2000).

There are countless other ways in which the biologist and the philosopher have been helpful to one another, and this will become all the more evident to the reader after having gone through this book. Also, the reader is encouraged to investigate the material in the philosophy of biology, philosophy of science, and the history of biology and science that is referenced at the end of this introduction. It is through the fruitful interactions of the biologist and the philosopher that the subject-matter of philosophy of biology has come to be the way that it is in its present state today.

The Subject-Matter of Philosophy of Biology

Every body of knowledge—science, discipline, study, domain—has a subject-matter and specific questions that give a limit, form, and function to that body. So, for example, biology studies parts, processes, and principles associated with living things primarily as its subject-matter, and not stamp-collecting, business ethics, or World War II.