

Aldo Fasolo, ed.

The Theory of Evolution and Its Impact.

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In *The Theory of Evolution and Its Impact*, Aldo Fasolo has assembled an impressively broad collection of historical and philosophical essays, each exploring the influence of evolutionary theory on other academic subject areas. Tying together wholly different philosophical investigations is always difficult, but this volume's refreshing tendency to emphasize breadth rather than depth or completeness gives the reader a sense of how evolutionary theory spread, rather than what its own origins are. The result is an exciting, readable sampler of up-to-date applied evolutionary theory. Although not suitable for an academic course with a strong focus on evolutionary biology itself, this book would be an ideal resource for students looking to learn what the implications of evolutionary biology have been.

The papers in *The Theory of Evolution and Its Impact* are taken from an inter-academy conference held in Torino, Italy on May 27–29, 2010 co-hosted by the *Accademia delle Scienze di Torino*, the *Accademia Nazionale dei Lincei* and the *Berlin-Brandenburgische Akademie der Wissenschaften*. Like similar contributed volumes, this work gathers scholarly essays from authors united by academic interest rather than thesis or philosophical inclination, but unlike other volumes, it does not structure the contributions in any particular format. As a result, the essays cover a broad span of philosophical, historical and scientific topics, ranging from pre-Darwinian biology to contemporary scientific developments. The collective aim of the book is to identify and describe the influence that evolutionary theory has had on a variety of philosophical problems, and not to build a case for a particular academic thesis. This is refreshing; the nature of the inquiry (i.e., identifying the influence of evolutionary theory on other disciplines, as opposed to the opposite – identifying the influences of other disciplines on evolutionary theory) is amenable to the unstructured format.

The strength of this book is the variety of genuinely novel philosophical and historical topics covered. I'll go over all the chapters in brief, and follow two examples that I found exceptionally interesting. The book consists of thirteen essays, each written by a single and unique contributor, as well as a short introduction (Chapter 1) written by the editor, Aldo Fasolo. Pietro Corsi provides a broad and engaging historical sketch of the scientific, political, and religious world of Lamarck in Chapter 2; this was particularly interesting, and is one of two essays I describe in greater detail below. Chapter 3, written by Michael Ruse, asks how well Darwin defended the fact of organic evolution (i.e., common descent and gradual mutability of phenotypes) rather than the mechanism of organic evolution he proposed in the *Origin* (natural selection). Chapter 4 has Paolo Casini parsing the differences between the various forms of 'philosophical darwinism' that predated Darwin's publishing of the *Origin*, with a focus on Spencer, Haeckel, Nietzsche, and Bergson. Chapter 5, written by Peter Weingart, focuses on the use and abuse of the "struggle for existence" metaphor; this chapter is also discussed in depth below. The next two chapters focus on the appropriation of evolutionary language, by cultural

anthropology for Henrika Kuklick's Chapter 6, and by linguistics for Manfred Bierwisch's Chapter 7. Chapter 8, by Alberto Piazza, is an exposition of recent developments in evolutionary genetics and their impact on our understanding of human evolution. Giuseppina Barsacchi's long but highly informative Chapter 9 focuses on explaining how the gradual integration of genetics and evolution into embryology has created the emerging field of 'evolutionary developmental biology' ('evo-devo'). In Chapter 10, Ferdinando Rossi explains how the nervous system has, through environment-dependent growth promotion of certain cells, been shaped by natural selection to include both highly conserved and highly plastic gene networks. Gerhard Roth's Chapter 11 explores the evolutionary history of the human brain and argues that while the human brain is not structurally unique, several key developmental changes distinguish it from the brains of other animals. In Chapter 12, Giorgio Vallortigara argues that belief in the supernatural is an unintended effect of humans possessing an evolved ability to discern animate objects from inanimate ones. Moving back to strictly philosophical territory, Volker Gerhardt discusses Leibniz's use of the word 'evolution' in chapter 13, Kant's critique of Leibniz's position, and the possibility that Darwinian evolution might resolve a longstanding dispute. Finally, in Chapter 14 Telmo Pievani interprets the structure of evolutionary theory using Imre Lakatos's model of a scientific research programme.

I'll briefly introduce two chapters that represent the best of this volume. First is Pietro Corsi's Chapter 2, which covered Lamarck's primary works, his pre-Darwinian evolutionary thought, and his influence on other naturalists. Here, Corsi argues against three common assumptions that students of the history of evolutionary theory often make about Lamarck: (1) that Lamarck's theories were wholly out of the scientific and literary mainstream opinion of his time; (2) that the "radical materialism" of Lamarck's doctrines provoked a stifling response from conservative political figures, isolating Lamarck from engagement with the larger scientific community in France; and (3) that Lamarck ended up without a sympathetic audience for his work, especially among the scientific elite. In refuting these hypotheses, this chapter highlighted the inadequacy of our contemporary understanding of Lamarck, especially the caricature of Lamarck as solely an advocate for the inheritance of acquired characteristics. Corsi's exposition is excellent, and the reader is treated to a fascinating portrait of one of evolutionary theory's most misunderstood champions.

The second essay that caught my eye was Peter Weingart's Chapter 5, which follows Darwin's metaphorical phrase "struggle for existence" as it lost its particular scientific denotation (in the *Origin*) and adopted a common meaning that was quite different. Weingart's thesis is that this "scientific metaphor" was first misappropriated by popularizers of science (such as Herbert Spencer), and then used out-of-context by political agitators in order to provide scientific (i.e., "natural") support for eugenicist and national socialist political ideologies. He traces the historical path of "struggle for existence" into the German "Kampf ums Dasein", and identified the combination of this phrase with others (i.e. "favoured races", which in German was (mis)translated as "vervollkommnete Rassen" or "perfected races") as the origin of the metaphor's association with political movements. Throughout this chapter, Weingart's command of the primary sources is notable and is particularly impressive. The reader is left with a much stronger understanding of the relationship between a "struggle for existence" qua Darwinian metaphor and as pseudoscientific political invective.

This volume has two notable weaknesses. First, the introductory chapter has not been copyedited properly, and consequently there are rather obvious and cringe-worthy errors in it (e.g., “how our brain evolved?” – 6). This is no minor quibble, since in many passages the language is confusing enough to make the author’s point ambiguous or even completely unclear. Fortunately, copyediting problems were confined to the introduction alone, with all contributed chapters using suitably precise scientific and/or philosophical language. Second, there seemed to be no agreed-upon scope for contributed papers. Several essays, particularly those that dealt with the emergence of the ‘evo-devo’ paradigm (e.g., Chapter 9) were long, comprehensive expositions of relatively specific problems. Other essays eschewed detail and opted instead for shorter, more accessible discussions of a broader topic. While both approaches worked on a chapter-by-chapter basis, switching from one to another made the book as a whole feel somewhat uneven.

Despite these minor faults, I enjoyed reading *The Theory of Evolution and Its Impact*, and would recommend it to anyone with a serious interest in evolutionary biology or the philosophy of biology. This volume is a thoroughly engaging collection of essays from across many academic disciplines: it will surprise many readers by showing the myriad ways that evolutionary theory has helped to form and reform ideas outside biology. I also note that this volume, as professional and scholarly as it was, was a consistently interesting, even fun, book to read. Although any academic reader may find some chapters to be more interesting than others, I am certain that nearly anyone interested in evolution will discover something genuinely new in these pages.

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