

Samir Okasha, Philosophy of Biology. A Very Short Introduction, Oxford: Oxford University Press, 2019, 152 pp.

Samir Okasha, Professor of Philosophy of Science at University of Bristol, analyses the main problems of philosophy of biology in his book *Philosophy of Biology: A Very Short Introduction* (2019), as the title suggests. Philosophy of biology is a very diverse field. Okasha presents the main problems and the current debates taking place in this discipline, highlights the key problems of philosophy of biology, and presents solutions and possible objections.

Okasha's book, despite being relatively short, addresses both topics that are central to the field, and, at the same time, other areas (e.g., molecular biology, sociobiology, etc.). At the end, the author gives excellent suggestions for further readings, arranged by chapters and topics. The book is divided in seven chapters, in which the author briefly describes the main problems and most commonly discussed topics in philosophy of biology. Some of these topics have already been mentioned in Okasha's *Philosophy of Science: A Very Short Introduction*, but in this book these topics are addressed more extensively, which means that the readers can become even more familiar with the major problems within this specific field.

Okasha draws attention to the fact that the book focuses primarily on evolutionary biology and genetics:

The focus is mainly on evolutionary biology and genetics, as these are the areas of biology that have traditionally attracted the most philosophical interest. In recent years this situation has changed somewhat, as philosophers of biology have turned their attention to areas such as developmental biology, immunology, and microbiology. (8)

It should be emphasized, as Okasha says, that the book offers insight into philosophy of biology regardless of the readers' prior knowledge.

In the first chapter, 'Why philosophy of biology?', the author explains why philosophy of biology is important in the first place. The chapter begins with a presentation of how the study of scientific methods was transformed

into a new discipline, philosophy of science, at the beginning of the 20th century, and, as the author explains, further branched off into philosophy of biology. In doing so, the author draws on various other authors who have made important contributions to the development of the philosophy of science, such as Descartes, Leibniz, Hempel, and Kuhn.

The author then draws attention to three important factors that influenced the emergence of philosophy of biology:

First, it became clear that traditional philosophy of science was too physics-centric—biology had been left out of the picture. Second, conceptual issues that arise within biology began to attract the interest of philosophers, leading to fruitful interdisciplinary exchanges. Third, proponents of ‘naturalized’ philosophy, which uses empirical science to help tackle philosophical problems, increasingly looked to biology for inspiration. (2)

At the beginning of the book, Okasha therefore commits himself to a brief historical overview of the development of philosophy of biology; this is important for understanding why biology was put in the background and why, in its initial period, most of philosophy of science was based on physics. Okasha illustrates this historical overview with examples from different fields of biology, with selected examples that support the interpretation marvellously.

In the second chapter, ‘Evolution and natural selection’, Okasha focuses, as the title itself tells us, on the theory of evolution and natural selection. In this chapter, he also examines the philosophical significance of this problem. Anyone dealing with the issue of natural selection and evolution cannot ignore Darwin’s *On the Origin of Species*, therefore Okasha presents the essential views in Darwin’s claims and briefly defines the basic features of natural selection. He includes various authors that are important for understanding Darwin’s natural selection in the analysis. At the same time, he does not ignore various objections. Okasha roughly presents the difference between proximal and final questions, i.e. between how and why questions, and summarizes and describes different views on evolution.

In the third chapter, ‘Function and adaptation’, the author explores the concept of a biological function and gives meaningful examples that accurately outline why functionality is important in biology and why we talk about functionality at all. In this chapter, Okasha also analyses the problems of adaptation in evolutionary biology and presents similarities and differences between biological function and the function of artifacts. Okasha also analyses, as he puts it, “the most popular philosophical analysis of function-talk in biology: the aetiological theory of function. The ‘aetiology’ of something means its causal history” (31-32).

In the fourth chapter, ‘Levels of selection’, the author sets out to find answers to the problems associated with natural selection and the question of whether natural selection works on individuals, genes, and groups. Okasha presents a distinction between how natural selection can be understood: at the level of the individual or at the level of group selection. The author also deals with the analysis of altruism in connection with group selection and presents critiques of group selection. He also analyses ‘kinship’ selection, highlighting the differences between altruistic and selfish individuals and the associated natural selection. Okasha goes into more detail on the prob-

lem of altruism and, in connection to that, also explains Hamilton's rule, which says that altruism will develop when certain conditions (known as Hamilton's rules) are met. William D. Hamilton says

... that altruism will evolve when a certain condition, known as Hamilton's rule, is satisfied. The rule states that $rb > c$, where c is the cost paid by the altruist and b is the benefit to the recipient, both measured in terms of biological fitness. The final term, r , is the 'coefficient of relationship' between altruist and recipient, which measures how closely related they are. The higher the value of r , the greater the likelihood that the recipient of the altruistic action will also possess the gene for altruism. (52)

Okasha also mentions Richard Dawkins' *The Selfish Gene*, in which Dawkins advocates a 'geno-centric' view of evolution.

In the fifth chapter, 'Species and classification', the author deals with the problem of classification in biology, which is one of the most frequently debated problems in this field. The problem itself was discussed by Okasha in his *Philosophy of Science: A Very short Introduction*, where he devoted one chapter to philosophy of biology and this topic. Nevertheless, here the author addresses the question of whether there is a right way of classifying biological species into taxon species and into higher taxa. Okasha says that "classification in science raises a deep philosophical issue" (Okasha, 2019, p. 63). Okasha presents Linnaeus' classification system, analyses taxonomy, the 'species problem' in biology, the concepts of species, the problem of species as an individual, and explains the phylogenetic system. In all of this, the focus is on authors who have had a significant impact in these areas.

In the sixth chapter, 'Genes', Okasha analyses the problem of genes and the concept of the gene. He presents a brief history of genetics and the authors that influenced this field (Mendel, Watson and Crick, etc.), and analyses the essential concepts and problems that arise in the field of genetics.

In the seventh chapter, 'Human behaviour, mind, and culture', the author deals with the connection between biology and culture in humans. He wonders if human behaviour and culture can be explained by biology. Okasha draws attention to a discussion that has been going on for some time and relates to the role of (biological) nature and environment in human development. It essentially refers to the issues surrounding the question: What makes us who we are (genes or environment; genes and environment)? Okasha gives various examples that support theses about the connection between nature and environment, for example phenylketonuria or PKU disease, "which results from a mutation that affects the ability to metabolize the amino acid phenylalanine, leading to brain damage. However, if an infant with the mutation is kept on a diet low in phenylalanine, their brain will develop normally" (105).

The author also presents the development of sociobiology, originating in the works of Edward Wilson. Okasha analyses, among other things, Wilson's examples of sociobiological explanations of social phenomena, such as incest. The author also presents critiques of the mentioned theories and at the same time explains the meaning of human culture and offers arguments for how (if at all) cultural evolution and biological (genetic) evolution are connected.

Based on the existence of cultural differences among humans, and the fact of gene-culture dual inheritance, it is suggested that a process of cultural evolution operates alongside genetic evolution in human populations, sometimes interacting with it. (116)

The book gives a brief but very detailed introduction to the field of philosophy of biology, with the author himself emphasizing that these philosophical questions are topical, widespread, and important in biological sciences.

One can agree with Okasha's concluding note, where he states that:

By scrutinizing the meaning of biological concepts, studying the implications of biological theories, and probing the logic of biological explanations, philosophy helps to deepen our understanding of the worldview painted by modern biology. (117)

The book *Philosophy of Biology: A Very Short Introduction* is an outstandingly interesting book and a great introduction that provides insight into essential problems touching the research area. The book is very readable and brings philosophy of biology closer to readers that do not have much experience in this field.

It is great that Okasha presented the main themes of philosophy of biology, whose issues cover several different areas and thus opens up new questions. Due to its brevity, clarity, and accuracy, the book offers the reader a solid introduction to the increasingly diverse field of philosophy of biology. The reader does not necessarily need in-depth knowledge of biology to understand it, and therefore to anyone who is interested in the topic, regardless of previous knowledge.

URŠKA MARTINC

University of Maribor, Maribor, Slovenia