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History and Philosophy of Biology. By Robert Kretsinger. World Scientific, 2015. Pp. 364. Price GBP 38.00. ISBN 9789814635042

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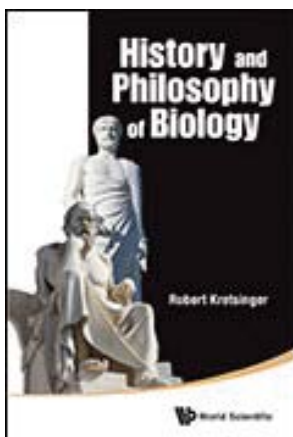
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History and Philosophy of Biology by Robert Kretsinger could as well have been called 'History and Philosophy of Science' as it reaches well beyond the realm of biology and includes historical advances made in mathematics, physics and chemistry. Robert Kretsinger is an experienced Commonwealth Professor of Biology at the University of Virginia. In terms of research he has produced a wealth of biochemical data on the evolution of EF hand proteins, and he is thus extremely qualified to address the topic of the evolution of biology. The book by Professor Kretsinger is divided into four major chapters dealing with an overview of history and philosophy; an overview of the physical sciences; an overview of biology; and a final section dealing with the evolution of society/science relationships. Each chapter is divided into small subchapters of about 5–8 pages, each of them being preceded by a one-page summary. Note that biology is only one of the four major sections and hence the proposed requalification of the whole volume. Of course biology has been profoundly influenced by chemistry, physics and mathematics, and it makes sense to first discuss all these fields in order to understand and put into perspective the amazing recent developments in biology. The front page of the book certainly suggests that the author is profoundly influenced by philosophy and mostly by Greek philosophy as it shows the statue of two Greek 'thinkers' one of them being presumably Socrates (unfortunately they are not formally identified).

Professor Kretsinger takes you on a historical and philosophical trip concerning science in general, and biology in particular, that spans several millennia. He will help you evaluate the relative contributions of the early civilizations of Greece and China, and also those of the Islamic and Western societies. Because of its carefully crafted subdivisions you can either go for a lengthy ride or, if you are too busy, read only a couple subchapters and go back to it later. The book shows a wide erudition with a total of more than 600 major contributors listed (you will travel along with Plato, Socrates, Hippocrates, Avicenna, Newton, Pasteur, Carl von Linné, Buffon, Cuvier, Darwin, Helmholtz, Humboldt, Bohr, Boltzmann, Einstein, Crick and Watson, to name just a few).

For those teachers and/or students interested in the evolution of science and the philosophical relationships with religion in particular, this is a must read. Not that it is exhaustive in any way, such a broad field can hardly be covered extensively in 340 pages, but it will give you the key to further reading should you so wish. In fact the four major sections of the book could easily give rise to four different volumes that would cover the different fields more extensively. Concerning the biology overview, history as told by Kretsinger explains that much has been derived from the need to cure people and the early observations of physiology, including experimentation/dissection on various subjects and not always on a voluntary basis (the ethics section being pretty damning concerning some historical aspects).

Some very welcome sections at the end of the book deal with ethics in science and especially fraud (a burning topic recently); the debate around the teaching of creationism and intelligent design; the still bumpy road separating (or is it linking?) science and religion; and the causes and problems of global warming for the environment. In a more complete version one would have liked to find some words on the latest technological developments (this is partly addressed earlier in the book, principally in the section dealing with industrialization in the 19th century). For example, the discovery of PCR by



Mullis *et al.* and the use of fluorescent proteins in cell biology from the work of Tsien *et al.* are certainly major landmarks of the late 20th century. Likewise, the chapter on the origin of life could be strengthened, the discovery of ATP generation through electrochemical gradients is also a wonderful story and the hunt for the 'universal' genetic code is another. More recently, the discovery of the flexibility of that code with the generation of selenocysteine coded by the opal codon in

certain circumstances is also truly a breakthrough story. Of course the development of the 'omics' and synthetic biology are likely to be the next frontier.

Nevertheless as noted before, the book displays really profound scientific and philosophical qualities and it opens the door to exploring in finer detail and understanding those never-ending developments of science, and especially of biology, in the 21st century.