

Philippe Huneman, ed., *Functions: Selection and Mechanism* (Dordrecht: Springer, 2013)

Reviewed by Ciprian Jeler¹

Scholars might nowadays be tempted to think that writing and publishing books might have become somewhat obsolete. In an academic environment where articles seem to have become all-important, publishing books might seem like an almost superfluous enterprise. However, this book, edited by Philippe Huneman and dealing with the meaning that the concept of function has within different scientific domains – from different branches of biology to psychology, neurosciences or within the study of human artifacts and design –, provides a good example as to why books or collective volumes such as this one continue to be important. It is under this light that I will discuss the book here.

The first point to make about the significance of this book is a historical one. A volume of original essays – i.e. unpublished previously – dedicated specifically to the notion of functions is bound to offer a retrospective view about the renewed philosophical interest that this notion has received since the 1970's. Even more so if we take into account the fact that some of the contributing authors (like William Wimsatt or Larry Wright) are among those who have largely been responsible for this renewed interest, by their seminal papers at the beginning of the 1970's. So, whether we look at the contributions of these authors or those of more recent philosophers that engage in new perspectives about functions, this volume provides a good overview of the controversies that have been carried around the notion(s) of function in different fields during the past four decades.

The second point to make about the significance of this volume is a referential one. During the last four decades, the notion of function has been philosophically analyzed in strict connection with the scientific practices and theories of various fields. The interest of publishing a collective volume about this notion today therefore also stems, as Philippe Huneman's introduction shows, from the recent developments within these specific fields. In biology, we might refer to the recent perspectives about what is necessary for the notion of natural selection (is heritability a necessary condition for selection as such? is the connection between fitness and reproduction self-evident?), to the recent accent

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put on the multiple levels of selection, to the “extension” of the classical evolutionary theory that is demanded by researchers in evolutionary developmental biology or in ecology; in other fields we might look towards the mechanistic view of science (in philosophy of science), towards theories in cognitive sciences (like “situated cognition”) that challenge classical views or towards new insights about the meaning of “realization” in the philosophy of mind. All of these recent developments, as Huneman shows in his introduction, might not easily accommodate older notions of ‘function’ and are indicating that a re-thinking of this concept might be necessary. The papers published in this volume are therefore called to respond to these new developments in various disciplines, and this certainly constitutes the main merit of the volume.

The last point about the significance of this book that I want to make is a symptomatic one. It is a point about what this book seems to me to reveal *without necessarily intending to do so*. The book is divided in four sections: the first two are dedicated to biology, while the last two sections are dedicated to psychology, philosophy of mind and technology. The interesting symptom that I think becomes obvious when reading the entire volume – as opposed, for example, to reading separate articles in different journals – is an asymmetry between the two main parts of the book. In the first two sections, virtually all the philosophers of biology that sign the papers advocate one form or another of pluralism about functions (the second section is specifically dedicated to pluralism, but the first one isn’t, so this shows an interesting regularity). On the other hand, the papers in the last two sections – whether they are dedicated to problems of cognitive sciences or philosophy of mind or to problems in philosophy of technology – vary a great deal more with respect to the positions assumed and to the meanings they attribute to the notion of functions in general. Of course, one could say that the classical etiological theory of functions sparked by Larry Wright in 1972 and later developed by other philosophers that link it directly to natural selection (thus transforming it into what is known as the selected-effects theory of functions) offers a more natural common ground for philosophers of biology. However, the way in which all the contributors to this volume seem to combine – even though, of course, the forms of this ‘combining’ *do* vary – this theory with versions of the equally classic “causal role” (or “systemic”) theory of functions (initiated by Cummins in 1973) is intriguing. I will not try to discuss here the reasons for such a similarity: it might be determined by the scientific field itself that they are philosophically dealing with (biology) or it might be determined by historical reasons. However, given the fact that some of these philosophers defend radically different views about other biological points (Robert Brandon, for example, who

defends a propensionist notion of fitness is highly critical towards the ‘statistical’ view of natural selection defended by Denis Walsh), this similarity or this partial convergence needs to be noted. It is in the light of this asymmetry between a smaller variation in positions in the first two sections and a greater variation in the last two sections that I will now briefly turn to each contribution.

Fittingly, the volume begins with a contribution by William Wimsatt. He restates his 1972 general form for attributions of function but, outlining some of the consequences of his more recent work on generative entrenchment and robustness, he shows that there is a limit to the differential selection account of functions and a causal-role functionalist might be right to resist it (especially when we situate ourselves in a macroevolutionary setting or an evolutionary developmental biology setting). The causal-role account of function – where it is needed and applicable – is however not right to give up a selectionist account of functions in general, but only a differential selection account.

Denis Walsh’s beautiful contribution contrasts causal/mechanical explanations with emergent teleological explanations. In certain fields (human agency, for example), they both provide, he argues, complete and autonomous explanations of the same phenomena, and his reasoning – stemming from Aristotle – is based upon the acceptance of an “explanatory emergence” that is altogether different from the notion of ontological emergence. He then goes on to show that recent developments in evo-devo (evolutionary developmental biology) appear to indicate goal-directed capacities of organisms that we cannot account for in a causal/mechanical setting without explanatory loss. An emergent teleological explanation would therefore be needed to complement the mechanistic explanation.

Jean Gayon’s contribution turns the weaknesses of the selective (or selective-effects) theories of function into their strengths by showing that even if we might have troubles to argue that oxygen or species do have a function within this framework, this renders selective theories of function more dependant on the specific scientific theories on which they are grounded, and hence, possibly, more reliable and more credible. However, in proposing that the apparent shortcoming of the selective theories of functions might be avoided by ascribing functions only to activities (and not to structures, such as oxygen, for example), Jean Gayon too is moving, in my view, towards a conciliation with the systemic or causal-role theory of functions.

Frédéric Bouchard’s interesting contribution is based on the notion of ecosystem evolution and on a more controversial thesis that the evolution of ecosystems might be described as natural selection on the persistence of

ecosystems, where the notion of persistence only partly involves reproduction (namely, of the biotal components therein). The intricacy between the reproducing biotal components (whose functions could thus be accounted by a selected-effects theory of functions) and non-biotal elements (whose functions are only accountable for in a causal-role mode, especially in cases of new ecosystem formation by landslides, hurricanes etc.) compels us, he claims, to resort to a realist explanatory pluralism, where both notions of functions need to be pertinent at the same time.

A similar idea is defended by Robert Brandon, by way of a more general demonstration as to why both historical and non-historical concepts and questions are needed both in geology and in evolutionary biology, and this implicates the use of both notions of functions at the same time.

A different version of pluralism – embedded in a “weak realism” – is defended in Philippe Huneman’s contribution. The selected-effects theory of function, he argues, is not capable of distinguishing between different properties of one trait in the specific cases where these properties yield equal fitness values. A different method for discriminating between the functions one trait might be said to have is then needed and, he shows, there actually are a number of *different* methods of this sort employed by evolutionary biologists. But these different methods might yield different results, hence the choice of the method will depend on the explanatory interest of the scientist. This entails the position that ascribed functions do belong to biological structures (hence, it is a realist position), but that they are also partly determined independently of the selected-effects theory of functions, so they might be in part explanation-relative (hence, the “weak” realism). This partial explanatory-relative character thus forces us to admit – at least in more complicated cases with multiple possible functional ascriptions – a combination of an etiological and a systemic theory of functions.

Having thus briefly described the contributions dedicated specifically to evolutionary biology (and various connected fields), we will now turn to the last two sections of the book.

Carl Craver’s paper is based on examples from neuroscience and on the new mechanical philosophy that he is (co)advocating, and it intends to show the multiple roles that teleological descriptions play in the search for mechanisms. Etiological notions of functions, while useful, can only play a certain part in explaining the very specific and complex phenomena that are studied in neuroscience. It needs to be complemented by functional descriptions that frame constitutive explanations (a function is therefore the factor that organizes and guides our description of how a higher-level mechanism is composed of lower-

level ones) and that help situate the focal mechanism within higher-level mechanisms. In the end, while making use of the notion of etiological function, Craver actually advocates a systemic view of functions that would be compatible with mechanistic philosophy.

A different – if not contrary – view seems to be offered by Carl Gillett. In his bold – while somewhat technical – contribution, he shows that the assumptions of what he calls the Standard Picture of functionalism in the last decades are not acceptable. Basing his argument on an example from neuroscience, he shows that the notion of second-order property in philosophy of mind is not justified, and that properties of the higher-level can be viewed as having causal powers in their own right since their lower-level “realizers” have *qualitatively different* properties that together result in the higher-level realized property. This might be paralleled with the point made in philosophy of biology (for example, by Samir Okasha) that higher-level selection is certainly reducible to lower-level processes, but it is explanatorily autonomous as long as it is not reducible to lower-level *selection*.

Françoise Longy’s contribution tries to show that a realist etiological theory of functions should be used in order to explain both biological phenomena as well as the functions of human artifacts. She shows why the idea that the functions of human artifacts are strictly mind-dependant is unfounded and outlines the way in which the introduction of the notions of probability and real kinds might help us provide the necessary conditions for a general and ontological etiological theory of functions applicable both to biological structures and human artifacts.

On the other hand, Pieter Vermaas and Wybo Houkes take the exactly opposite route and try to generalize the “ICE-theory of functions” they have designed over the last few years specifically to account for human artifacts. They analyze multiple ways in which such a generalization could be done in order to encompass biological phenomena, and their conclusion is that only an *epistemic* way is available for such a generalization, namely that of defining functions of biological phenomena not as belonging to these phenomena themselves, but as belonging to the scientific practices that relate to these phenomena and try to explain them. A general application of their ICE-theory of functions, they argue, can be done only if we give up the idea that real functions are present in the biological phenomena themselves. This is certainly a strong and maybe not the most appealing of positions.

The volume is concluded by a very informative epilogue written by Larry Wright, in which he compares teleological biological phenomena with human agency in order to show that they both exhibit an intricacy between a functional

pattern and functional virtues, and that a clear demarcation between these two notions is needed in the future if we are to better grasp the notion of function. This fitting final essay of the paper certainly makes us look forward to reading his forthcoming book on “the concept of a reason”.

The brief outline of the chapters of the book that I’ve just given here, guided as it was by the asymmetry between its initial and its final sections, has insisted a lot on the way the contributions relate to the two main theories of function that have divided the field during the last decades. In this respect, the sketchy presentation I’ve given certainly doesn’t do justice to the quality of these contributions and to how thought-provoking some of them are. But in the end, these last aspects are the ones that make this book a very good read for anyone working in philosophy of biology, philosophy of mind or philosophy of technology. Moreover, the way the notion of function permeates different research fields and connects (or at least partially connects) different elements and notions – from natural selection to agency, from physiologic or neurophysiologic phenomena to human artifacts – certainly makes this book a rewarding read for any philosopher.