Eric Margolis, Richard Samuels and Stephen P. Stich, eds. *The Oxford Handbook of Philosophy of Cognitive Science*. Oxford University Press 2012. 576 pp. $160.00 USD (Hardcover ISBN 9780195309799).

Oxford *Handbooks* aim to provide authoritative overviews of the latest, leading research in specialist subjects. Not only are these texts valuable as teaching aids, they also provide academics and graduate students seeking to branch out into new fields with a sturdy footing. The dust-jacket of this *Handbook* markets its contents as: 'an indispensable resource for anyone seeking to understand the implications of cognitive science for philosophy, and the role of philosophy within the interdisciplinary enterprise of cognitive science'. At present, the need for such a resource is exigent and gladly, in this case, the dust-jacket does not deceive.

For the much of the 20th century, the wide acceptance of behaviorism meant that research into cognition was assigned marginal, 'fringe' status and the view that anything was going on *inside* the head dismissed as unenlightened 'folk' psychology. Research that made allusions to anything 'mental' or any methodologies that included 'introspection' were deemed suspect. Scientists redirected their investigations to those aspects of human life that could be objectively analyzed and explained in terms of other observable (physical) phenomena. However, the latter half of the 1980s saw a proliferation of studies falling under the umbrella of 'cognitive science'. Undoubtedly, a major reason for this revival of interest in 'looking inside' was the development of functional neuroimaging techniques that make it possible to *see* cognition in action. Does this imply that all the questions historically posed by philosophers and psychologists about the mind can now be answered in the lab? Clearly not, as this *Handbook* demonstrates, for every question cognitive science can shed light on, more emerge from the shade. It is exactly these questions that are given expert treatment in every chapter of this book, though there is only space to provide a flavor here.

To begin with, it seems apt to ask, now that we can see images of brain-functioning, what exactly do we see in these images? This question is tricky because, in order to be able to interpret this data, some theory of how brain processes correspond to cognition must be in place. Today, the hypothesis most cognitive scientists subscribe to is *computationalism*; broadly, the view that 'cognitive systems work like computers' (223). Chapter 10, by Gualtiero Piccinini, provides a rich, critical survey of computationalism; from its origins in Alan Turing's mathematical accounts of computation, to the birth of modern computationalism, to its present-day dominance. Although computationalism is not without its dissenters, due to its unrivaled 'explanatory power' (224), Piccinini concludes, it's 'here to stay' (243). What remains to be determined, however, are 'the specific computations on which cognition depends' (243).

If one accepts that cognition is like, or even *is* 'computation', then questions about exactly *how far* this insight can take us arise. These are addressed from two very different angles here. Richard Samuels's 'Massive Modularity' is primarily concerned with 'the scope and limits of computational explanation' (60), with regard to constructing a 'story for how cognition works' at the structural level (87) and Diane Proudfoot and B. Jack Copeland test the conceivable limits of 'Artificial Intelligence' in their witty, engaging contribution. They expose logical flaws in important arguments both for and against 'strong AI', the view that computers will be able to '*duplicate* intelligence, thought, understanding, and other cognitive abilities' (153), then they critique Ray Kurzweil's radical, futurist ideas about the potential for 'runaway AI'(147). Kurzweil's futurism, rooted in his 'Law of Accelerating Returns' which 'holds that the rate of progress of any evolutionary

process...increases over time...and the rate of exponential growth itself grows exponentially' (168), is observed to both fail to account for counter-evidence (170) and underestimate 'the metaphysical difficulties for..."immortal software-based humans"' (171). For Proudfoot and Copeland, the matter of whether or not computers processing capacities will be able to match, or even exceed, human cognition cannot be settled 'a priori' as '[o]nly trying will tell' (173).

Robert Van Gulick begins the second chapter by specifying ten interpretations of the term 'consciousness', then he illustrates how the endorsement of one or another of these interpretations bears upon the relation posited to exist between consciousness and cognition in various philosophical, cognitive, and neurobiological accounts of cognition–in no trivial way. 'Representationalism', 'Innateness', and 'Reason and Rationality' are given similar treatment by Frances Egan, Steven Gross and Georges Rey, and Collin Allen, Peter M. Todd, and Jonathan M. Weinberg, respectively. Though each of these chapters start by doing some conceptual groundwork, they all testify to the claim made in the introduction that, in the philosophy of cognitive science, 'there is much more for philosophers to do than just clarify concepts' (12).

Not only is conceptual-analysis unusually telling in this field, so, it seems, is *counting*. Jesse J. Prinz, in his pithy chapter, shows how the almost certainly–practically–impossible task of counting emotions, is theoretically illuminating, since it forces one to consider the boundaries between emotions and what sort of phenomenon an emotion must be to be individuated in this way. Prinz defends a neo-Jamesian 'somatic appraisal theory' of emotion, on the grounds that this account 'does a better job at explaining the range of emotions than its competitors' (183). Themes in this chapter nicely echo Allen, Todd, and Weinberg's point that many assumptions made on the basis of the 'Residual Cartesianism' that still has a stranglehold on 'philosophical and psychological theorizing about rationality' (55) fail to appreciate the centrality of emotions to human experience and their potential involvement in some rational processes.

Stephen Laurence and Eric Margolis wrestle with 'The Scope of the Contextual', a major area of cross-over between philosophy and cognitive science. 'Concepts' (variously construed) have often been considered the building-blocks of human cognition and, accordingly, the distinction between 'conceptual' and 'non-conceptual' mental states has traditionally doubled-up as a means of separating adult human thought from that of infants and animals. Laurence and Margolis warn against investing too much in this distinction, maintaining that, too often, theorists have been guilty of the *conceptualization fallacy,* the assumption 'that when conceptualization occurs given a prior representational state that the prior representational state isn't itself conceptual' (295). They challenge philosophical arguments that distinguish human thought on the basis of its capacity to employ concepts: singling-out 'concept-users' must be 'well-motivated', else 'the conceptual/non-conceptual distinction amounts to little more than a vehicle for dignifying an arbitrary difference between humans and animals' (311). Importantly, Donald Davidson's arguments, perhaps the most well-known for making use of this distinction, are not deemed to be 'well-motivated' (314).

Though the editors deny that this *Handbook* is intended to be 'comprehensive' (3), it makes a pretty good attempt. Issues also addressed in this volume are: 'Embodied Cognition' (Chapter 6), 'Cognition and the Brain' (Chapter 12), 'Perception and Multimodality' (Chapter 5), 'Theory of Mind' (Chapter 17), 'Evolutionary Psychology' (Chapter 20), 'Culture and Cognition' (Chapter 21), and there are four chapters concerned with the human capacity for language acquisition (Chapters 14, 15, 16, and 18). Though styles vary, each chapter references generously and displays a high level of expertise in a way that does not preclude its accessibility.

Nonetheless, a chapter exploring the interactions between cognitive science and phenomenology is wanting, not only because of deep philosophical interest in contrasting subjective experience with objective data, which is appreciated by both Christopher Mole (214-5) and Casey O'Callaghan (104-10), but even more so because a constant theme volume is the danger of unqualified assumptions. Such assumptions are found to underlie: Donald Broadbent's highly influential Biased Competition Model, by Mole (209); empiricist accounts of concept acquisition, by Susan A. Gelman and Elizabeth A. Ware (464-8), and individualist approaches to both moral rationality, by John M. Doris and Shaun Nichols and cognition in general, by Daniel M. T Fessler and Edouard Machery. In the final chapter, this warning is reinforced by Joshua Knobe's description of the gauntlet laid down by the new movement of 'Experimental Philosophy' before those analytic philosophers who would resist it: if the aim of analytic philosophy is to discover more about 'people's concepts and their intuitions', they must show how this can be satisfactorily achieved 'from the armchair' (541). Phenomenology has, since its inception, cultivated methods of purging assumptions from its investigations and much recent phenomenological research *already* enjoys a fruitful engagement with cognitive science (Dorothée Legrand's, for example). Many renowned theorists strongly contest the view that phenomenology is an 'unlikely foundation for a contemporary science of mind' (121); some of these do not even feature in the Index (John Haugeland, Dan Zahavi), others (Shaun Gallagher, Mark Rowlands, Evan Thompson, Francisco Varela) get a 'nod', but their work is not considered in any detail. Phenomenology plainly deserves more serious attention here.

This aside, *The Oxford Handbook of Philosophy of Cognitive Science* does exactly what an Oxford *Handbook* should. It is quite a feat to assemble such a plethora of approaches, across a range of attitudes as well as areas of interdisciplinary cross-over, especially when one considers the highly technical nature of many topics within this field. Praise is due to Margolis, Samuels, and Stich for their choice, handling, and contextualization of the chapters in their helpful introduction. Perhaps the most important things any reader will take from this text is proof that a mutually-enlightening dialogue between philosophy and cognitive science is very much *flourishing* and a sense of where further research is most required.

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