

### **The Oxford Companion to Consciousness**

Tim Bayne, Axel Cleeremans & Patrick Wilken (Eds.)

New York: Oxford University Press, 2009

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This impressive tome is the product of considerable effort by its three editors and by many contributors. Without a doubt it is the most comprehensive book of its kind now available. While I will go on to make some critical remarks, I want to state first that I think every researcher in the field of consciousness, and every college or university library, should own a copy.

*The Oxford Companion to Consciousness* is unlike two other recently published volumes on consciousness (Velmans & Schneider, 2007; Zelazo, Moscovitch, & Thompson, 2007), each comprising several dozen full-length review essays on central topics in the field. Instead of taking that approach, Bayne, Cleeremans and Wilken have assembled a much larger set of much shorter essays, which cover not just the central topics but also a wide swath of more peripheral ones. The editors acknowledge a debt to Richard Gregory's magisterial and eclectic *Oxford Companion to the Mind* (2004), and note that topics to be covered in the book were generated with the help of an analysis of a decade of meeting reports from the Association for the Scientific Study of Consciousness. The book is, then, in essence, an encyclopedia—a work of reference.

Faced with the challenge of reviewing such a volume in a few pages, one is limited to some rather programmatic remarks that will inevitably fail to convey the book's full scope. I shall endeavor to evaluate its usefulness as a reference work.

There are 244 entries, arranged alphabetically from "access consciousness" through to "zombies." While those first and last entries both happen to be on subjects that are philosophical in origin and which continue to exercise philosophers more than scientists, the volume is in fact dominated by entries on the scientific aspects of the study of consciousness. Noting this fact in their preface, the editors state forthrightly that in their view, "a full understanding of consciousness will be reached—if at all—only with the methods of science" (p. xii). As I worked my way through the book, I counted 69 entries that were primarily philosophical, with another 18 or so

that were at least partially concerned with philosophical issues. That leaves just under two-thirds of the entries falling squarely into scientific territory.

The scientific entries themselves are diverse. Some outline leading theories of consciousness, such as “information integration theory” or “global workspace theory.” Others address phenomena that are thought to be related to consciousness, like “metacognition,” “automaticity” or “déjà vu.” Many entries describe methodologies, from ways of recording brain activity (such as “magnetoencephalography”) to techniques for gathering and analyzing behavioral responses (“signal detection theory,” “protocol analysis”). There are many entries on deficits or disorders of consciousness, such as “agnosia” and “schizophrenia.” There is a wonderful sequence of entries on animal consciousness: as well as a general overview, there are entries on dolphins, the great apes, and ravens (the book’s cover is graced by a raven in flight), and finally, one on “animal metacognition and consciousness.” Someone wanting an authoritative primer on current research into consciousness in nonhuman animals need look no further.

A nice feature of the book is the inclusion of paired entries on certain topics, with one entry addressing the topic from a philosophical perspective and the other from a scientific perspective. Indeed, I found myself wishing there had been more of these. A philosophical perspective on animal consciousness would have been welcome, for example. The ten topics that receive this dual treatment are “action,” “colour,” “dreaming,” “emotion,” “imagery,” “musical experience,” “orgasm,” “pain,” “self,” and “temporality.”

The presence of a philosophical entry on orgasm is indicative of the editors’ intention to cast a wide net. Discussion of orgasm appears in the philosophical literature on consciousness as a purported counter-example to representational theories of phenomenal character. One might therefore have thought it would be included in the “representationalism” entry rather than given its own entry. However, I think the editors have taken some delight in including a few entries like this one that are on somewhat unexpected topics. There are also entries on “Spock” (the *Star Trek* character) and “wine and consciousness.”

The contributors—many or most of whose names will be familiar to anyone with even a passing interest in consciousness—for the most part are responsible for only one entry apiece (with some entries coauthored by two or three people). A notable exception is editor Tim Bayne, who himself contributes 12 entries—though many of those are on the shorter side, covering subjects such as homunculi or the pineal gland (and also the philosophical entry on orgasm).

The average entry is around 2,000 words, though some are more than twice that long and a few are less than 1,000. The more lengthy entries are very substantial pieces which typically do an excellent job of sketching the territory of the subject at hand. On the whole though, this is not a book for those who are new to cognitive science. Most entries are dense with information and often with technical language. Of necessity, experiments and arguments are sketched with an economy that sometimes leaves one wishing for more detail. However, those inspired to go looking for more detail will find that most entries carry a substantial bibliography.

There are some entries that in themselves barely mention consciousness at all. I surmise that the editors expect their target audience to have enough background knowledge to understand the relevance to consciousness of (for example) problems concerning representation. For graduate students or professional researchers, then, the book is a goldmine of current knowledge.

Some contributors take their entry as an opportunity to expound their own views. In some cases this is because a researcher has been invited to write an entry on their own theory. For example, Daniel Dennett covers “heterophenomenology,” and Semir Zeki the theory of “microconsciousness.” Naturally, the creator of a view is likely to be the person best placed to describe it. However, some entries that purport to offer a general survey of an area of study (as opposed to a particular theory) turn out to have a pronounced partiality in favor of the author’s own theory. An example is the entry on scientific perspectives on imagery, written by Stephen Kosslyn and two of his collaborators. There is a decades-long debate between “pictorial” and “descriptive” accounts of visual imagery. Kosslyn is the most prominent defender of the pictorial view. His entry is an unabated defense of that view. Remarkably, the work of Zenon Pylyshyn, the most prominent critic of the pictorial view, is not even mentioned. In this case, happily, there is a

paired entry on imagery from the philosophical perspective which provides some more balanced coverage. But the philosophical entries are not always free of partiality either. David Rosenthal structures his entry on “philosophy and the study of consciousness” as a defense of the higher-order thought theory. He covers plenty of ground in what is one of the longest entries in the book, but I find it a bit unfortunate that the perspective one gets from the entry is so noticeably colored by the author’s own theoretical leanings.

The book contains a number of figures and diagrams, especially for the scientific entries. The figures in the text are in black and white, but some are reproduced as color plates in the middle of the book. This is particularly valuable for those entries that feature pictures of brain scans, which frequently use color in their representation of neural activity. A hiccup occurs with the figures in the “M” section. In the entry on iconic memory (that is: “memory, iconic”) a figure, referred to in the text, is omitted.

While on the subject of editorial slips, I will note that there are typographical errors every few pages, though they are typically of little consequence. And for context, I should emphasize just how lengthy a book this is. The page count alone—just under 700 pages—does not convey the full impression, for the font size is also very small. There are some 1,000 words per page. The entire work must therefore be at least 600,000 words. Overall it is very well edited. The occasional misplaced word can be forgiven.

There is, however, a more puzzling omission: the *Companion* lacks an index. This can make it rather awkward to navigate. For example, suppose one wishes to find all the entries that mention Daniel Dennett, or that mention priming. The only way to achieve the former goal is to search through the likely entries for Dennett’s name. Regarding the latter, there is some help in that many entries include cross-references to other entries. One could begin with the entry on priming and then follow the cross-references. But an index would allow a more complete, and less cumbersome, search. Exacerbating the issue is the fact that it is not always obvious where to find a particular entry to begin with. Suppose, for example, one wanted to look for an entry on smell. Looking up “smell,” one would find nothing, for the entry appears under the technical

name, “olfaction.” That is fine, but one would expect a cross-reference from “smell” to “olfaction.” The book does have entries that are just cross-references—for instance, the entry for “feedback, neural” simply points to the entry for “re-entrant processing”—but they are rather haphazard. Relatedly, for topics whose name involves more than one word, it is not always clear under which word the entry will appear. For example, while the entry on neural feedback appears under “F,” the entry for cognitive feelings appears under “C” (and there is no cross-reference from “feelings, cognitive”). An index would have made these little obstacles moot.

The explanation for the missing index may be that, as I suggested earlier, the editors have decided that their target audience is researchers who already know the field well enough to be able to find what they want in the book without the help of an index. Perhaps this is a fair assumption, but I still think that some users of the book will find the lack of an index inconvenient.

Rather than end on a negative note (and I emphasize that the absent index is more an annoyance than a serious concern), let me now return to singing the book’s praises. One of its best features is that it highlights the interdisciplinarity of the field. I earlier mentioned that some 18 entries covered philosophical territory but were not exclusively philosophical in their content. In closing let me point out several of these entries that most caught my attention and interest. The entry on “body image and body schema” is by philosopher Shaun Gallagher, but its interdisciplinarity can be seen in its bibliography, which features numerous philosophical pieces alongside articles from the journals *Science* and *Cortex*. Similarly, the entry on “confabulation,” by philosopher William Hirstein, is an admirable synthesis of philosophical analysis and empirical findings. Gallagher and Hirstein have each recently authored a book on their respective topics. Similarly, psychologist Euan Macphail draws on his own noted research in his very articulate entry on the “evolution of consciousness.”

I cannot imagine any cognitive scientist who would not profit from delving into this very fine book. I strongly recommend it to anyone with an interest in consciousness.

## References

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*Gary Bartlett*  
*Department of Philosophy & Religious Studies*  
*Central Washington University*  
*Ellensburg, WA 98926-7555, USA*  
*Email: bartletg@cwu.edu*