Book Reviews

Margaret Boden
Mind as Machine: A History of Cognitive Science
Oxford University Press, 2006, 2 Volumes, 1704 pp., £125.00
ISBN 0 19 924144 9 (hbk).

A personal reading by Igor Aleksander

It is blindingly clear that Margaret Boden's major work, *Mind as Machine*, must be reckoned a triumphant literary event among histories of cognitive science. While this may sound forbidding, especially since it occupies over 1700 pages in two volumes, its undoubted intellectual weight is made accessible in the style of a personal history. Boden has lived cognitive science and contributed to its current shape as an authoritative critic and commentator. Wherever there has been an interesting debate about mind, she gives the impression of having been there, of having lived through it. Wishing to avoid a catalogue of the massive coverage of this work, I here restrict myself to some personal reactions that come from having lived through the same era.

I first read Boden's work in 1977 when I reviewed her seminal early book on AI: *Artificial Intelligence and Natural Man*. I was struck then by the eloquent way that she, with a background in Medical Science and Philosophy, interpreted the varied pronouncements of researchers in AI laboratories and presented them convincingly to an audience of scientists who might not necessarily be versed in logic or computation. Nearly thirty years later, she revisits the field now as a much appreciated player. Don't look for pat definitions of cognitive science, she advises: concentrate on what those who call themselves cognitive scientists have done and the methods they have employed. So the focus is on the doers and their ideas, well punctuated by personal anecdotes.

Boden describes her strategy as asking 'mind questions' that everyone has asked at some time or another: Why is the brain necessary? What are mental powers? How does one go about explaining mental phenomena? … The best answers, she suggests, are those that make sense when expressed clearly enough to be potentially run on a computer. The logic and execution of the algorithm impress her as having greater solidity than earlier belief-based psychology and philosophy of mind. *That* is her basis for a cognitive science that has explanatory powers. *That* is what one achieves by treating mind as machine.

The issues of machines as minds, as opposed to minds as machines, are clearly distinguished. Boden favours the latter because it is largely an analytical stance, which points to the failures that await in the constructionist approaches of those who look for mind in the machines they have built. Here I dissent a little as, in engineering, the 'mind' of a machine may be well expressed as a rich and revealing 'state-space' of structures (i.e. an abstract structure of both possible and impossible state transitions that can be related to, and derived from, an adaptive physical structure and its 'learning'). It is quite possible to differentiate between state structures that have cognitive properties and those that do not. So, looking for minds in state structures may be a very important activity in cognitive science. Boden, however, holds a strong line against this, for which her volumes will be praised by like-minded individuals. But time, and advancing familiarity with state thinking, will tell. In the meantime, the books do contain useful accounts of some very specific state-space expressions as found in Kauffman's discovery of stability in genetic systems, emergent patterns of activity in complex systems as studied at the Santa Fe Institute and Von Neumann's cellular automata.

Boden takes much trouble to argue that not all cognitive psychology falls within cognitive science because it is not always 'computational'. But what is it to be computational? This is a surprisingly problematic issue, resolved after some debate as the 'explanation by plausible algorithm' noted earlier. I was surprised that, in the context of cognitive psychology, there is little about Colin Cherry of Imperial College who, in the late 1950s, in gentle competition with Donald Broadbent (who *is* much mentioned), coined and modelled the 'cocktail party problem': that is, our ability to switch auditory attention between competing streams of speech. Cherry expressed his theory in rigorous terms including non-linear circuit theory. This suggests that 'computation' can be taken to have a broader range of meaning than an algorithm that runs on a computer. While Boden merely quotes Richard Gregory's memory of Cherry as 'too fast a speaker at a

conference', Howard Gardner (in the authoritative *The Mind's New Science: A History of the Cognitive Revolution*) hails him as Britain's pioneer cognitive psychologist.

Boden clearly sees cognitive science as a phoenix arising from the ashes of the dark ages of behaviourism. To be sure, allowing for internal processes was a step forward, but Boden's stronger point is that being able to express such processes as clearly stated algorithms had new explanatory power that helped to blow behaviourism out of the water. There is much in both volumes that captures the optimism of the late 1960s and early 1970s, about the seemingly boundless possibilities of computing processes that model aspects of thought. But not all were enthused. For instance Ulric Neisser, who at first embraced the computational stance and then rejected it for fear that it would lead cognitive research away from its human and cultural aims. A most engaging chapter is devoted to anthropological approaches as they impact on cognitive science and vice-versa, showing that much valuable research on the cultural impact of cognitive theory is still to come.

A thorough assessment of language and natural language processing concludes the first volume. The second volume begins with some of the early successes of AI. Success is a matter of interpretation and Boden gives both advocates and detractors a significant voice. But then she sees as 'scandalous' the much debated report by James Lighthill who, on behalf of the Science Research Council of the UK, criticised the lack of progress of AI particularly at Edinburgh University. She bemoans the fact that the report hit the headlines but not so its detailed rebuttals. As a member of the SRC computing committee at that time, all I can say is that the rebuttals were not always made with the scalpel-sharp, unquestionable clarity that might have attracted more press attention.

Amid the debates that led to new funding protocols for more realistic work, such as the Fifth Generation programme in Japan and reactions in the USA and the UK, Boden discovers the resurgence of neural networks (connectionism) as a colourful *Kraken* (the mythical, re-awakening sea-monster of Norse legend). Thought to have been slain by Minsky and Papert in the in the late 1960s, Boden charts the 1980s revival of neural systems as a way of achieving artificial cognition. Acknowledging the excellent interviews by Anderson and Rosenfeld (1998) she describes the contributions of mainly US workers in this field. Sadly this misses the work of the extraordinary Italian cyberneticist, Eduardo Caianiello whose far-sighted 'neuronic' equations for dynamic nets are still highly significant. They anticipated by

about 20 years some of the 1980s work by Hopfield, Hinton and Grossberg.

On a personal note, I sought a general discrete-domain model of dynamic neural nets from the mid-1960s. In 1979 I gave a seminar at Sussex University on the potential effect of this on cognitive science, with Margaret Boden, Aaron Sloman and Christopher Longuet-Higgins in the audience. At a highly convivial dinner afterwards, I was torn apart by Longuet-Higgins who decried the paucity of what one can learn with dynamic neural nets because, being equivalent to just layers of 'perceptrons', they had been discredited by Minsky and Papert. These objections were proved to be misplaced over the next five or six years, but bashing neural nets and those interested in them was the fashion of the time. Boden notes that Geoffrey Hinton (a former Sussex researcher) and like-minded folk held a meeting in California in 1979 that was to lead to the *Kraken* threat to the AI establishment through the influential Parallel Distributed Processing books — MIT Press 1986. Boden writes: 'The awakening of connectionism invigorated many philosophers and psychologists'. This was not in evidence in Sussex in1979: scepticism and derision of connectionism were paramount.

As this is, after all, written for the *Journal of Consciousness Studies*, it is worth pointing out that similar scepticism and derision, from philosophers and psychologists, still continues as cognitive scientists attempt to approach the many thorny notions of consciousness through computation and neural systems. As Boden mentions in passing, a meeting organised by philosopher David Chalmers, theoretician and neuroscientist Christof Koch and information engineer Rodney Goodman took place in 2001 at the Cold Spring Harbour Laboratories in the US on the possibility of 'machine consciousness'. The result was that 19 of the 20 present (divided roughly equally among philosophers, neuroscientists and cognitive scientists) believed in the beneficial, clarifying value of 'machine consciousness' as a paradigm. The results were compiled by Holland (2003) in *JCS* and the paradigm is now recruiting new researchers. Boden herself keeps open a tiny chink in the door of scepticism by saying that yes, useful machine models of consciousness may arise but only through some surprising, now unknown, possibly 'crazy' approach. I actually think that pretty sober approaches may be creeping in at this very moment. As a personal quibble I note that she suggests that I was describing my laptop as being conscious (with no reference to this pronouncement). This is pure nonsense; what I *do* maintain in all my publications (e.g. Aleksander, 2005) is that it is possible to study an emulated organism

as being conscious of a world where *both* are virtual in the laptop. Or the conscious machine might be a robot (as in Holland's work) becoming conscious of a real world in a thoroughly robot-like way, tested by several criteria (e.g. as set out by Crick & Koch [2003], Metzinger [2000] or Aleksander [2005]). The artificial organisms may not be conscious of very much, but at least one can keep the discussion going about what mechanisms are common to mind and machine. However, such earthy approaches may not be unusual enough or 'crazy' enough to satisfy those who see consciousness through a veil of impossible complexity or mystery.

Clearly those who have lived through the development of this important subject will find minor points of disagreement with Boden's personal perspective, as I have done. But all will surely admire her comprehensive coverage and clarity of expression. In her closing chapters, Boden selects what she thinks is the most promising vein for future research: 'computational architectures integrating knowledge, motivation and emotion'. I fully agree. But I am sure that she will forgive those who do this research in their artificial domains, provided they manage to throw some light on what is meant by 'being conscious' through being as interested in studying the state structures of the brain as they are in descriptive algorithms.

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Herbert S. Terrace and Janet Metcalfe, eds.
The Missing Link in Cognition: Origins of Self-Reflective Consciousness
Oxford University Press, 2005, 384 pp., £46.00
ISBN 0 19 516156 4 (hbk).

Reviewed by Gary Fuhrman

This book originated in a conference on primate cognition, convened by the editors at Columbia University in 2002. The title summarises the stance taken in the editorial introduction, which assumes a wide gap between human mentality and that of other animals (including other primates). Since language is taken to exist only on the human side of the gap, its structure is not considered relevant to the inquiry here. The question is rather where 'self-reflective consciousness' could have come from: 'How did this pinnacle of human mental life — self-reflective consciousness — evolve, and how much does it depend on language?' (p. xiii). Rather than defining language broadly and looking for primitive forms of it, the approach here is to define 'metacognition' broadly and look for 'metacognitive precursors' of human-style thinking. The challenge, then, is to investigate the metacognitive abilities of creatures related to us, but who can't use language to tell us what they are thinking. Accordingly, the conference brought together several primatologists involved in the study of metacognition, along with theorists in related but more human-centred fields.

This line of inquiry reflects the predilections of Herbert Terrace, who played a prominent and sceptical role in the acrimonious ape-language controversy of the late 1970s. His contribution here continues to offer a 'killjoy interpretation of an ape's use of symbols' (p. 101). He argues that human metacognitive and mind-reading skills, beyond age two or so, already exceed those of adult apes, and he accuses other researchers of 'sheer projection' when they read 'intentional meaning' into symbol use and other ape behaviours (pp. 99–100). But what if such 'projection' is inseparable from intersubjective relations? Janet Metcalfe and Hedy Kober seem to imply as much in designating the 'projectable self' as a key component of 'self-reflective consciousness.' Studies of human ontogeny, such as Katherine Nelson's in this volume, show that metacognitive skills develop in a social context involving mutual recognition and expectation. If we normally interact by reading intentions into each other, eliminating this factor from observations of apes (if possible at

all) might work as a self-fulfilling prophecy, resulting in a study that renders its own hypothesis unfalsifiable and therefore untestable.

In any case, Terrace clearly stands on one side of a debate which Endel Tulving, in the opening essay of this collection, compares to a 'tug of war.' On Terrace's side, human uniqueness is 'given' and the problem is to explain how human mentality could emerge from other forms. The editors refer to the other side of the debate as 'Darwin's continuity hypothesis,' since Darwin claimed in his *Descent of Man* that 'there is no fundamental difference between man and the higher mammals in their mental faculties,' any gap between them being 'filled up by numberless gradations.' Most of the other primatologists represented here seem to lean in the latter direction; so does philosopher Marcel Kinsbourne, who finds 'a continuum of self-consciousness that emerges in phylogeny and ontogeny.' Patricia Kitcher draws similar conclusions, summarising and then challenging the belief of Locke and other modern philosophers 'that in self-consciousness they had finally found the key to human uniqueness' (p. 185).

Contributors on the other end of the 'rope' emphasize differences between humans and others but disagree about what makes us uniquely human. E. T. Higgins, for instance, argues that humans are 'unique in being applied motivation scientists' (p. 170). Tulving also places himself in this camp, naming *episodic memory* (and the 'autonoetic' kind of consciousness associated with it) as uniquely human, while *semantic* memory is widespread, at least among mammals and birds. Several other contributors here make use of this distinction, although the terms (dating from 1983) are problematic. The simplest way to capture their basic sense is to consider a case study which Tulving presents at some length. The patient ('KC'), 'cannot remember anything that has happened to him'. Although his memory for facts (semantic memory) is near normal, including facts about his own past, he cannot recall the experience of living through events in his life. For instance, 'he knows that he owned a Black Honda, but does not remember a single trip he ever took in it' (p. 24). To put it another way, he lacks any sense of subjective or 'felt time' (p. 29). According to Tulving this deficit, rare among humans, is universal in other animals. This would entail that scrub jays, who can keep track of how recently they have hidden a food item as well as its location, nevertheless do not *remember* the act of hiding it. Likewise, a chimp might know the individual traits of others in his troop, yet be unable to recall past interactions with them, or imagine future encounters. This last point is crucial for Tulving, who observes that KC's deficit has rendered him incapable of anticipating his own future; on this he bases

a theory that 'episodic memory' is a necessary condition for future planning — a circumstance conferring the adaptive value which accounts for its selection in humans (though that would not explain its absence in other primates). Tulving also claims that his attribution of episodic memory exclusively to humans is testable without recourse to language. He offers abstract criteria on which to base such a test, but provides no concrete details. Besides, at least one primate described elsewhere in the book seems to have passed Tulving's test already, as the editors remark in their introduction (p. xix; unfortunately, Tulving does not comment directly on this case).

That brings us to the primatologists' research reports, which furnish this collection with its weightiest content. Some of these also outshine the more theoretical pieces in the care given by authors to interpreting results. All of them investigate various forms of 'metacognition' — for instance, the ability to judge the reliability of one's own judgements. This is J. David Smith's focus in his studies of 'uncertainty monitoring' in monkeys and dolphins. He used perceptual discrimination tasks which included an 'escape' response option, taking which can plausibly be attributed to uncertainty. The subjects in such tests do appear in some sense to know how reliable their own judgements are, though it does not necessarily follow that they are conscious of those judgements. Similar or related forms of metacognition have been tested, with similar results, in studies reported here by Lisa Son, Nate Kornell and Robert Hampton. Josep Call takes a different tack in his studies of 'mental state attribution', showing that all four kinds of apes (but not dogs) typically 'seek information' in situations where they can use it. This serves as a 'metacognitive index' because seeking information implies some awareness of a need for it.

Call's article is also a good choice to wind up the collection because of its emphasis on *social* cognition. In this respect he reinforces the contribution of Nelson, who outlines six 'emerging levels of consciousness in early human development'. If the analogy to evolutionary process is salient, this suggests a compromise solution to the 'tug of war,' by replacing both the singularity of a 'missing link' and the vague notion of 'numberless gradations' with a small number of definite stages, each building on its predecessors. Perhaps the social factor explains why the most compelling evidence for the 'continuity hypothesis' comes from studies of apes who have lived most of their lives in a context of interaction with humans. These include Bennett Schwartz's study of a gorilla named King, and Charles Menzel's work with Panzee, the remarkable chimp whose photo graces the book's dust jacket. We can't go into detail here, but what these primates do

certainly looks like 'episodic memory' — if that faculty is observable at all, which is questionable. We might well ask whether strictly 'empirical' methods alone could demonstrate its existence even in humans (*pace* Tulving, how could we in fact detect absence of autobiographical memories in KC if he couldn't verbally answer questions?). A careful reading of the present volume, especially its second half, shows that empirical methodology has its limitations, especially when it is presupposed that no common ground exists between humans and other primates.

We might conclude that, on balance, this book supports the continuity hypothesis, but much more cautiously than popular explorations of the territory such as Frans de Waal's *Our Inner Ape*. Perhaps caution explains why *The Missing Link* avoids delving into socio-political implications of this inquiry, which de Waal emphasizes — and rightly so, for it may be perilous to ignore those implications, given the current state of the planet. Thomas Berry even asserts (in the opening pages of *The Great Work*, 1999) that 'the deepest cause of the present devastation is found in a mode of consciousness that has established a radical discontinuity between the human and other modes of being.' If this new book helps to show how much of our mental life we share with our primate cousins, as I believe it does, then the message is all the more convincing for the editors' apparent reluctance to endorse it. It directs us towards a better understanding of the human role in the natural order precisely because it *doesn't* preach to the converted.

Derek Denton
The Primordial Emotions: The Dawning of Consciousness
Oxford University Press, 2006, 296 pp., ISBN 0 19 920314 8

Reviewed by Eva Jablonka[1] and Simona Ginsburg[2]

An evolutionary approach to consciousness is badly needed. When did consciousness first arise? What are its benefits? How was it first instantiated? An answer to these questions could provide a basis for tackling more ambitious ones. Derek Denton starts with a very simple and fundamental intuition: 'The primordial emotions — the subjective element of the instinctive behaviour subserving control of the vegetative systems of the body — were the beginning of consciousness' (p. 205). Emotions ('feeling' is an equivalent term for him) are subjective, belong to the whole animal rather than to its parts, and

[1] Tel Aviv University, Israel

[2] The Open University of Israel

have survival value because they are intentional states motivating actions that relieve or reinforce the corresponding feelings and restore homeostasis.

His basic assumption, that the point of departure for understanding the origin of consciousness should be emotion rather than perception or motor acts, leads Denton to look at the most basic of feelings – the ones most obviously related to survival: i.e. thirst, the need to get the right balance of gases, minerals and nutrients, and to eliminate wastes, pain and sexual urges. Denton calls the feelings associated with these needs 'primordial emotions'. They are initiated by receptors located deep within the body (interoceptors), although, with both sex and pain, externally located receptors (exteroceptors) are also involved. Most of these receptors signal that survival is threatened, and are felt as 'imperious states of arousal and compelling intentions to act' (p.7).

Denton's focus on homeostatic mechanisms is novel and offers an alternative to other suggestions, such as Gerald Edelman's notion of primary consciousness arising from the animal's capacity to create a mental image or 'scene' of external events and objects, a capacity initiated by distance receptors (exteroceptors). According to Denton, primordial emotions differ from secondary or 'classic' emotions such as anger, fear, and love in several ways: (i) They are harder to suppress. (ii) It is harder to imagine them in the absence of the exciting stimulus. (iii) Their neural basis is located in the phylogenetically ancient medulla, midbrain and hypothalamus, not in 'newer' brain areas. (iv) They are activated by less complex mechanisms and are generally less dependent on perception of the outside world (although sex and pain are obvious exceptions).

In chapters 1-5, Denton discuses how the concept of consciousness has been employed by others, and its relation to 'self awareness'. His own position fits existing philosophical, psychological and neurobiological traditions, he argues, but has unique attributes. He then goes on to look more closely at consciousness in animals, trying to establish that not only mammals and birds have it but also reptiles, fish and octopi. The criterion he adopts for consciousness seems to be Christoph Koch's 'delayed response' — if an animal can respond to a stimulus after a time delay and following a distraction, this implies internal storage if the stimulus and some measure of consciousness (says Koch). Since most responses, to hunger or thirst for example, are delayed and distracters are likely to occur during the delay, it follows that 'consciousness' will be associated with them. Denton illustrates this point with a beautiful account of elephants that go mining for salt in a cave, followed by a discussion of the evolutionary

origins of need for salt and water in land vertebrates. This provides a gripping introduction to the second, more empirical, part of the book (chapters 6–10).

The empirical section kicks off with an imaginary dialogue between Denton and Edelman, who regards consciousness as arising from the perceptual categorization of inputs from eyes, ears, nose, etc. These enable an animal to construct an image of its world, to which it may respond with motor acts. Edelman allows that internal information contributes to the world image, but regards feelings aroused by internal sensory inputs as of secondary importance. Denton, on the other hand, gives a central role to interoceptors associated with the body's basic homeostatic mechanisms. Interoception, he says, initiates the signals that lead to his crucial primordial emotions. He reviews the many imaging and other studies which show that such emotions (and thus, he claims, consciousness) are phylogenetically ancient, concentrating particularly on studies of thirst.

In the third part of the book (chapters 11–12) Denton returns to more theoretical questions, to do with emotions and their definition, providing a good review of existing perspectives. He does not accept a distinction between emotions and feelings, although recognizing the two major aspects of emotion — the public and the private. His view is consistent with others, he suggests.

Denton's book is original and important. We agree with his basic point that a biological account of feeling — a somewhat nebulous experiential state reflecting a need or its fulfilment — should be central to explaining the nature and the origins of consciousness. Denton's view helps to integrate physiological concerns with neuroscience, which is an important contribution. Reference to primordial emotions and the physiological systems underlying them are indeed essential to any complete account of consciousness. The book is well written. Despite alternations between the theoretical and the empirical, it is clear and full of beautiful examples of animal needs and behaviours. Salt mining elephants, hognose snakes feigning death, lizards jumping madly in rain water and drinking avidly after being water deprived, dreaming kittens falling into water from small artificial islands, all populate the book. There is, however, one basic problem with the theoretical framework, while some pertinent questions are unaddressed; also there's a surprising omission, plus the seemingly inevitable (although here very few) inaccuracies.

The importance Denton places on the distinction between the roles of intero and extero receptors seems to us unjustified, despite our sympathy for his emphasis on the significance of interoreceptors

associated with basic homeostatic functions. First, it is clear that both types of receptor are involved in sex and pain, so an exclusive focus on internal receptors is unwarranted. Second, the interconnectedness of the nervous system surely implies that the two types are functionally related; the overall pattern of activity, with interacting and reverberating motor and sensory neural elements, is likely to be what generates feelings. A plausible evolutionary account of consciousness should give this due weight.

Denton mainly discusses land vertebrates — naturally enough for this is his area of expertise. He believes that animals such as worms or flies do not have primordial feelings. But what is the difference between their complex sensory processing and primordial emotion? When does the first transform into the second? Since Denton accepts that a mammalian brain is not required for them, and that primordial emotions are an ancient vertebrate adaptation, it's not at all obvious that they are restricted to vertebrates. It is not clear how complex a brain needs to be for such emotions to arise; nor is it obvious why the searching behaviour of a food-deprived fly does not reflect the primordial emotion of hunger. Related questions concern the evolution of a value system based on feelings: how did such a system evolve, and what kind of nervous system does it require?

We were surprised to find no mention of Nicholas Humphrey's work (1992) in Denton's otherwise extensive review. His explicitly evolutionary approach, and distinction between intero- and exteroceptors, echo Humphrey's similar strategy and distinction between sensation and perception. Like Denton, he thinks that sensation (what the animal knows about what happens to its own body) is prior to perception (what the animal knows about the external world). Although Humphrey does not make the mistake of locating the distinction between perception and sensation at the receptor level, and recognizes that both internal and distance receptors may be involved in both sensation and perception, the two views have much in common. Discussion of the similarities and differences would have been useful.

Minor points needing attention are: table 4.1 is at least 5 years out of date with its estimation of 70,000 protein-coding genes in mammals (the true number is now known to be about half that); second, although Denton states explicitly that mammalian brain organization is not necessary for consciousness, he infers that vision in general must rely on brain areas similar to those found in vertebrate brains (pp. 8, 10). The cubuzoan eye, a complex organ found in a group of cnidarians (with their hugely different nervous system organization), is an obvious case in point.

Nevertheless this book deserves to influence the discourse on consciousness, making it more physiological (not just neurophysiological) and more focused on the major question — the emergence of feelings. Its explicitly evolutionary approach is important, since without such an approach little progress can be made — though we do think that this particular account lacks many crucial elements. The book is also valuable in providing a good review of present-day biological and psychological approaches to consciousness, together with illuminating examples of primordial feelings in animals.

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David M. Rosenthal
Consciousness and Mind
Oxford University Press, 2005, x + 378pp., £55.00
ISBN 0 19 823697 2 (hbk).

Reviewed by John Dance

Consciousness and Mind comprises a collection of 13 articles. Two are previously unpublished — though the material derives from earlier lectures; the rest appeared in academic publications over a twenty year period from 1986. Grouping into four sections helps maintain thematic coherence. The first section focuses on 'Explaining Consciousness', the second on 'Qualitative Consciousness and Homomorphism', the next on 'Consciousness, Expression and Interpretation'. The final essay is on self-consciousness. Most of the articles have been updated either by slight textual modifications or by the addition of footnotes, while an introductory essay aims to pull everything together. The particular view of consciousness discussed here is the 'higher order thoughts' theory of which Rosenthal is a proponent. I imagine that anyone reading this review will already be acquainted with the idea. It has been well aired in *JCS* and elsewhere so I do not propose to explicate it in any detail. Suffice to say it concerns the role of higher order thoughts in making unconscious mental events conscious, arguing that consciousness is a relational property of mental states.

The book, despite a fair degree of thematic unity, suffers (at least for a reviewer) from two difficulties commonly associated with such compilations. Firstly, the articles are taken out of context. This sometimes made the arguments rather hard to get to grips with. Starting with first essay, I felt as if I had come in half-way through a private

conversation which was, if not in a foreign language, then in a rather broad dialect. I was initially so lead astray by this as to wonder whether Rosenthal was proposing a Cartesian theory of consciousness. Of course, as becomes apparent later, he strongly opposes this view. Secondly there is, inevitably, quite a lot of repetition. But though repetition has the cumulative effect of clarifying Rosenthal's position, other difficulties militate against a ready acceptance of his theory. In particular I was concerned by Rosenthal's use of the English language and what may be loosely termed his 'methodology'. It turns out of course that the two are different aspects of the same problem.

I would first like to comment on the use of language. In the earlier essays in particular sentences are often cumbersome and meanings hard to construe. Some sentences simply appear not to make sense — I suspect this is something to do with the use of 'cut and paste' on the word processor but this shouldn't get as far as the published version. Added to this I found a number of apparent contradictions and incorrectly used words. I'm not suggesting that a fine prose style should be a prerequisite for getting into print — not every historian need aspire to be a Gibbons. But in philosophy it does seems that clarity of expression should be a *sine qua non* especially where the use and meaning of natural language is at issue.

Secondly I would like to comment on the sustainability of the HOT theory. This has generated a good deal of interest. *JCS* has published three articles which specifically discuss Rosenthal while his views also feature in a number of recent books. Thus the present publication would have been timely had it addressed current concerns more directly, and more convincingly responded to some of the critics. For example, some writers feel that the HOT theory can be rejected on the grounds of explanatory insufficiency. Schröder (2001) argues strongly for this view. Georgalis (2006) suggests that HOTs are the redundant artefacts of an exclusively third person methodology. Given the current, increasing, interest in first person methods, the present publication misses an opportunity.

Another difficulty of HOT theories appears to be the possibility of an infinite regress of causes. Rosenthal, to my mind, fails to put a very convincing stop to this. Indeed he unwittingly seems to concede the possibility. After all, he gives us second order thoughts (which make mental events conscious), third order thoughts (which make second order ones accessible) and fourth order ones (which allow introspection), rather flippantly suggesting that the limit on this process is the size of the human skull! A further methodological problem is related to homomorphism theory. This is imposed on Rosenthal by the need to

support his views on 'sensory qualities'. But homomorphism is a branch of mathematical logic developed in the 1930s by Tarski to investigate the structure of formal languages. Rosenthal offers no convincing explanation as to why this is an appropriate tool to use in these circumstances.

Yet another suspect item in Rosenthal's tool box is the 'mental state' (he also has mental events, attitudes, and qualities). Now mental states etc. are stock in trade in consciousness research. But these are just so much historical baggage and a variety of arguments suggest they could well be dumped — the only justification for using the term is as a kind of (misleading) shorthand. After all if we scrutinize the items in this category they do seem a heterogeneous bunch. And since mental states turn out to bear a very heavy explanatory burden in Rosenthal's theory this publication misses another opportunity. Rosenthal does offer the information that all mental states are intentional or qualitative but not physiological. Rockwell (1996), in an article comparing the approaches of Rosenthal and Dennett, suggests a generalisation — 'inhabitants of our subjective space'. Gennaro (2005), in a paper that defends HOT theory against a range of criticisms, merely asserts that whatever they are they must be causal. I'm not sure that this takes us very far. If we stay within the bounds of common sense and common usage, as Rosenthal frequently encourages us to do, the grounds for putting such statements as 'I have a pain in my foot' and 'I believe in God' in the same category seem far from obvious. That our own mental states can be unconscious, yet, at the same time, known to other people is also strongly counterintuitive.

I eventually realised that the unease I felt reading this book was caused by the systematic misappropriation of language, and that this, while not helped by stylistic infelicities, was actually an artifact of Rosenthal's method. As Rockwell appositely remarks, Rosenthal uses a 'top-down' approach and 'ordinary language analysis'. But this is exactly the problem. Rosenthal has chosen the wrong tool for the wrong job. Sorting out one problem simply creates another. In short we have here an egregious category mistake. Searle (1983), with his insight that mental states are biological phenomena, partly escaped this conceptual straightjacket and was able to point a way forward. Unfortunately, Rosenthal rejects 'biological naturalism' as a remote and uninteresting possibility with no functional utility and thus remains tangled in a 'web of language'.

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Stanislav Grof
When the Impossible Happens
Sounds True, 2006, pp. 360 + xxxv, ISBN: 1 59 179420 X (pbk.)

Reviewed by Chris Nunn

Back in the Middle Ages, it was generally understood that this world is a down-market suburb of a far larger, 'spiritual' cosmos. In every generation since that view crumbled, able and influential thinkers have arisen from outside of conventional religious traditions to proclaim much the same message. One thinks especially of the late-nineteenth-century spiritualists, William James himself, some of the early twentieth-century theosophists, and of Aldous Huxley a generation later. It's a message that regularly recurs in slightly different guises, but never seems to make much progress. Stanislav Grof, a leader of the 'transpersonal psychology' movement and a psychiatrist well-known for pioneering work on the uses of LSD, is a modern avatar of this tradition. His latest book, *When the Impossible Happens* offers a collection of anecdotes of experiences to do with the supposed larger reality, many of them his own.

In some ways the *zeitgeist* today provides the most friendly environment for the message that has existed at any time since the Enlightenment. After all, cosmologists are telling us that our visible universe may be embedded in an infinite set of others, while we can detect only 4–5% of the 'matter' within it. And the either/or logic that has characterized the last few centuries is gradually being subsumed into both/and thinking that is already at the basis of quantum theory. How does the message come across in this particular 'incarnation'? Does it now have potential to progress? I'd like first to give you my impression of the downside.

The book is clearly written and divided into sections dealing with 'synchronicity', 'reincarnation', 'ESP' and the like, though there is naturally a lot of overlap between categories. The prose style,

especially in 'Part 1', was not to my (traditionally British) taste, combining as it does West Coast saccharin — nearly every one of Grof's acquaintances, it seems, is totally amazing, a dearest friend, or both — with a sort of stiffness. Grof himself is of Czech origin and probably has a lively sense of humour, but it does not come across in his book. The one joke he does recount struck me as unpleasant rather than funny. This is a pity as some of the tales, those to do with Swami Muktananda or an elderly tribal shaman who was imported into the Esalen Institute (in California) for instance, are distinctly risible. Acknowledgement of their potential for humour might have given them added verisimilitude. Grof does admit that gurus and shamans have something of the Trickster about them, but that's about as far as he goes.

These gripes are a matter of taste only, but there are two more serious problems. The first is that Grof nowhere acknowledges that our intuitions about probability are notoriously unreliable. He recounts numerous examples of surprising co-incidences, particularly in the section on 'synchronicity', but some at least of these are not so much more surprising than the fact that, if you go to a largish cocktail party, the chance of meeting someone sharing the same birthday as your own is quite high. Basically the problem is that he sees personally surprising (because meaningful) co-incidences as also statistically 'surprising', when it is not at all clear that he is always justified in doing so. Similarly, he seems to make little or no allowance for misremembering or misreporting emotionally charged events, while false memory syndrome hardly gets a look in.

The second general problem is that, thinking of the analogy with a Victorian spiritualist, Grof is often trying to combine the role of 'investigator' with that of 'medium'. And the trouble here is that, while investigators were mostly highly intelligent, independent scholars, mediums generally made a living from their activities. As many scandals showed, they were not above consciously or unconsciously introducing a bit of trickery when the spirits failed to deliver. Now Grof himself comes across as an engagingly honest, energetic, sensitive and perceptive person. However, it is also clear that he makes his living from the field, in particular from 'Holotropic Breathwork' courses and workshops. If they were not perceived as totally amazing, by himself and most participants, he would presumably have had to look for another source of income. No cynic who reads the book is going to ignore this.

So does the book amount to anything more than a bit of vaguely 'New Age' hype? My initial answer to this question was 'probably

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not'. 'Holotropic Breathwork' sounded to me much like the old psychiatric technique of 'abreaction', widely used in the 1950s and 60s, with an added focus on re-living alleged birth traumas. And abreaction dropped out of favour partly because, as with hypnotic regression, experience showed that alleged traumas were often fantasies, expressing preconceived ideas deriving from both therapists and patients. Then again, many of the individual anecdotes were, I thought, suggestive of the sorts of phenomena that crop up in settings that promote 'mass hysteria', such as revivalist church meetings. And who in their senses would put credence on them? But quite soon I began to wonder whether my initial, dismissive response was adequate — so here's my impression of the upside …

Grof's honesty and courage in pursuit of his unorthodox interests are very apparent. As with nearly all successful, presumably charismatic (I've never met him) therapists, there is more than a hint of ego inflation at times, but this doesn't detract from his believability. He himself clearly accepts that the marvellous tales he has to tell are deeply significant. And, overall, it's hard to disagree with him here. I won't repeat any of the individual stories for each on its own could be explained away, though it would be hard to do so in some cases. It's the steady accumulation of accounts of a very wide variety of remarkable phenomena that impresses. It soon becomes evident that there is *something* going on which cannot be explained in terms of current 'mainstream' thinking. What the 'something' is remains totally unclear. The alternative, that it's all down to illusion and self- deception, must appear more incredible than the phenomena themselves to every reader but the most diehard of diehards.

In summary, this is not a book to think of in either/or terms, for it is many things: part reportage from the wilder frontiers of experience, part snake-oil, part New Age twaddle, part conveyor of the indubitable truth that our current understandings of mind, time and causation are incomplete, and part signpost to future research. The final part is the most significant, for it offers real hope of progress in contrast to mere repetition of the age-old 'message' cycle. It is implicit, not explicit, in what Grof has to say, and is to do with re-instating the formal psychedelic research programmes that fell to 'friendly fire' 40 years ago, casualties of the American 'war on drugs': a war whose most obvious outcome has been, not to reduce drug use for that has increased, but the amazing efficiency with which it has created and enriched criminals. This book convinced me that there is so much to be explored via psychedelics that it would be crazy not to do so, provided it could be done formally and with adequate methodology.

Alexander Batthyany and Avshalom Elitzur, eds.
Mind and its Place in the World:
Non-Reductionist Approaches to the Ontology of Consciousness
Frankfurt, Germany: Ontos Verlag, 2006, 323 pp.,
ISBN 3 937202 98 6

Reviewed by Arkady Plotnitsky

The proliferation of articles and books, many of them of high quality, on consciousness studies itself (still a relatively new field), and in more established fields such as neurobiology, psychology and philosophy, testify to recent progress in getting to grips with consciousness. Somewhat paradoxically, one might say that we now know *less* about consciousness than we used to, or that more is now unknown about it. This is in the nature of all true progress. Better knowledge always uncovers more of what is still unknown; climbing foothills reveals the mountain ranges ahead.

What makes this particular book stand out from the crowd of available writings on the subject? In a sentence, its special contribution is to do with the range of questions posed concerning *both* non-reductionist *and* reductionist approaches to our understanding of consciousness. Indeed, while non-reductionism is the book's primary concern and agenda, those subscribing to reductionist views may benefit just as much from reading these essays, because of the thoroughness with which both perspectives are explored. In addition, a number of diverse, sometimes unexpected, themes and phenomena are discussed, such as telepathy or the near-death experience. There are no killer arguments for or against either position. We've not yet reached a stage where making these would be possible. Rather, the book offers readers a balanced view of the pros and cons of both approaches.

There's space here for comments on only a small proportion of the collection, which is a pity as multifariousness is one of its main virtues. While Alexander Batthyany's introduction offers a useful overall view, Avshalom Elitzur's essay sets the agenda of the volume in especially sharp and even dramatic terms. Taking its point of departure from David Chalmers (a recurring reference in the collection), Elitzur's essay, written as a dialogue, is a powerful statement of the difficulty (perhaps ultimately the impossibility) of a scientific understanding of consciousness — at least a *reductionist* scientific understanding of consciousness. Qualia define consciousness but appear to make a science (specifically a physics, either classical or quantum) of it all but impossible. Elitzur writes:

> Just ask, *a priori*: Can any such property of matter [as used in modern mathematical physics] assure me, in principle, that my quale of red is not my fellow human's quale of blue? Worse, can any such explanation enable me to prove than my fellow human has qualia at all? … You see, this is not a question of more knowledge. Qualia lie, *in principle*, out of any possible physical account (p. 20).

This is why, according to Elitzur, a reductionist scientific solution to the mind body program is as far away as ever, in spite of the progress made by physics, chemistry, and biological sciences in our understanding of the brain itself, and it's why exploration of non-reductionist approaches may be helpful or even imperative. The question that remains open is that of the possibility of a non-reductionist or less reductionist scientific approach to the problem of consciousness, as Elitzur indeed suggests in closing his essay.

Peter King's 'One Man's Meat Is Another Man's Person' is arguably the most efficient essay in the collection, which also offers an intriguing 'adaptation' of Thomas Kuhn's and Imre Lakatos' 'account of science to the philosophy of mind,' although, as King observes, both approaches are inevitably 'altered' in the process (p. 72). The essay compels us — reductionist or non-reductionist, monist or dualist, physicalist or not — to think harder about the problems of these approaches and about the categories themselves. King's closing comment (again, via Chalmers) illustrates my own overall view of the collection:

> [Chalmers], like a number of other writers, recognizes the problems facing physicalism, but can't quite bring himself to give up most of the physicalist assumptions. He therefore opts for an attribute dualism which is metaphysically obscure, but which has the advantage of pointing to the more glaring problems with the physicalism proper. My hope is that the resulting shift won't simply be to another Kuhnian-style disciplinary matrix, but will involve an opening out of the philosophy of the mind to embrace all strands of genuinely philosophical thought (pp. 73–4).

This is a tall order, which might, however, require more physicalism than King appears to be willing to allow.

Peter Lloyd's 'Mental Monism as a Solution of the Mind-Body Problem' is the longest essay in the collection, and takes advantage of this to offer an especially detailed discussion of a number of actual and possible approaches to the problem of consciousness. Ostensibly, the essay centres on the significance of George Berkeley's philosophy for the mind–body problem, and is commendable for directing our attention to notions that may well deserve more attention that they

usually get. I am not convinced, however, about the possibility of a satisfactory Berkeleyan solution of the mind body problem or, more generally, about the 'failure of materialism' — to cite the title of the last essay (by J. Kenneth Arnette). Lloyd's essay, however, allows us to view Berkeley's thought in the light of contemporary consciousness studies and, reciprocally, to better understand the problems of consciousness through Berkeley's thought.

While, given my own interest in quantum theory and in Spinoza, I especially looked forward to reading Gershon Kurizki's 'Quantum Monism: Spinozicism Revived?' I found the essay ultimately disappointing. Along with Berkeley, Spinoza is a welcome addition to the consciousness discourse, so Kurizki's introduction of Spinozan monism is valuable. Also, Kurizki's mathematization of Spinoza's ideas, specifically ones in his *Ethics*, along the lines of quantum-mechanical formalism, is impressive and intriguing. That said, however, in my view this short (perhaps too short) account suffers from its attempt to *reductively* mathematize Spinoza's philosophy. It might have been preferable to have given quantum mechanics a Spinozan philosophical richness, rather than reduce Spinoza to mathematics — even that of quantum theory, which has a special mathematical richness.

Still, the essay and, with it, the book poses yet another important problem — one foreshadowed in Elitzur's contribution — that of the proper relationship between philosophy and science when it comes to questions of consciousness and ontology. Heidegger tackled the same question in *Being and Time*, giving more weight to philosophy than science, but regarded consciousness or at least thinking (*Denken*) as indissociable from the problem. In following this agenda and, in this respect, Heidegger, this book both invites us to think more deeply about the nature of consciousness and thinking, and provides useful tools to help us do so.

Gary L. Drescher
Good and Real: Demystifying Paradoxes from Physics to Ethics
Cambridge, MA: MIT Press, 2006, 366 pp., ISBN 0 262 04233 9

Reviewed by Chris Clarke

Purely deterministic approaches to understanding consciousness are somewhat out of fashion now. Quantum theory (often misunderstood or clouded by unnecessary metaphysical trappings), the increasing use of stochastic models in a wide range of disciplines, the

rediscovery of philosophical approaches alternative to logical positivism, and many other influences, have all tended to displace the clarity of science's original mechanistic vision — albeit without having yet delivered a viable alternative. This book skilfully argues for a mechanistic approach to the universe and to consciousness, making it an important reference point within the literature. As it happens, I am firmly opposed to the author's position but shall try here both to set out the author's case, which is strong, and my own disagreement.

The argument proceeds through three stages; first, a critique of the reasoning that has led many authors, from Descartes onwards, to adopt dualistic approaches; next criticism of arguments suggesting that quantum theory implies a role for dualistic consciousness, or at least introduces an important indeterminism into the universe; finally, a compatibilist account is given of how human decision making and ethics can properly be justified on the basis of mechanistic determinism. A number of other pertinent issues, such as the flow and directionality of time, are dealt with en route.

The first stage, countering dualism, provides the main foundation of the book. Its pivotal point is an enquiry into the nature of consciousness (Chapter 2). A good critical review of those who regard consciousness as extra-physical leads to the Great Divide in consciousness research. Drescher stands alongside Dennett and many others who propose that some particular structural feature distinguishes consciousness from unconscious mental processes. On the other side stand Chalmers, Velmans and those who argue that consciousness is more than this, on the grounds that *any* particular structure of mental processing could always be conceived of as occurring without consciousness. To understand the difference between the two sides, consider Drescher's statement: 'Of course there is something we perceive when we think we perceive our extra-physical consciousness — that is, when we perceive conscious events such as our thoughts, feelings, perceptions , and so on.' It is clear from this that for him consciousness is something we perceive, or an aspect of things we perceive. For Velmans, however, 'consciousness' is essentially synonymous with 'awareness', and is not *what* we perceive but that *whereby* we perceive. It's not a matter just of different theories, but of using the same word for two different things. Drescher does not refer to consciousness in Velmans' sense, a difference possibly signifying a 'blind-spot' that becomes crucial later in the book.

Drescher does, however, talk a great deal of sense about 'consciousness' as he defines it, a structural aspect that is indeed present as part of everyday conscious awareness. He rejects the 'Cartesian

Theatre' image of consciousness but offers a convincing alternative, the 'Cartesian camcorder', in which perception is played back after a short or long delay, so that it can at this stage be processed, related to the self-image and so on. It would be useful to link this picture with current experimental research in cognitive psychology.

Stage 2 of the argument for mechanism analyses quantum theory with a view to showing that both the idea of observer-dependence, and that of wave function collapse, are unnecessary metaphysical additions to a deterministic quantum formalism. As with the previous stage, there are some well presented arguments, and demystifications of entrenched views, but also some crucial omissions. He gives a careful and understandable, but simplified, account of the 'many histories' approach, which avoids some of the unattractive features of 'many worlds'. The problem with this, however, is that the full picture depends on a particular choice of basis in Hilbert space at each instant of time, whereas, in the simplified version given here, such a choice is fixed from the start by the assumptions. Thus, while Drescher correctly criticises the 'collapse' interpretation for having 'no formal criterion for what constitutes an observation', he papers over an equivalent problem with his own theory.

This lacuna, to my mind, requires an extension of orthodox quantum theory by a non-deterministic element, or by consciousness, or both. One example of the first is provided by Penrose's recent work (which Penrose formulates it in terms of a 'collapse' metaphysics, though this is not strictly necessary). Drescher skilfully critiques the part of this dealing with Gödel's theorem, but ignores the application of Penrose's work to the basis problem. Here Drescher fails to address any of the more recent arguments for an active, non-deterministic role of consciousness in the universe.

While the first two stages suffered from crucial omissions, it was the third stage in the argument, with the treatment of ethics at its core, that I found the most problematic. Here we move from interesting speculations about physics to matters of the survival of human civilisation. At the start there are again many excellent clarifications: the earlier parts offer the most convincing defence that I have read of the view that determinism is compatible with free choice. Moving on from this, Drescher addresses issues of ethics, which he rightly treats as vital to our human condition. He asserts that 'the post-modern retreat from objectivity ... is disastrous with regard to ethics' and on the basis of this sets out to construct 'objective' foundations for ethics. First, he identifies 'post-modernism' with 'ethical relativism', and therewith dismisses most of modern ethical thinking in favour of such

minimal ethics as can be derived from a purely rationalist, utilitarian (in the broad sense) approach.

The problem here is a confusion between relativity and relativism. Einstein's general relativity, as an example, analyses the relativity of the perspectives of different observers in order to construct a new absolute — curved space time. Similarly, post-modernism discloses the relativity caused by social conditioning in order (in the hands of, say, Derrida or Lacan) to find a new absolute for human ethics. Many fail to take that step, however, and turn relativity into relativism. This new absolute lies not in the 'objective' (in the sense of a structure independent of consciousness) but in those aspects of the subjective that go beyond the individual. The 'objective' ethic praised by Drescher depends on an assignment of values to goals that is necessarily dependent on society, and is hence subject to manipulation of values by commercial interests. Within postmodernism, on the other hand, it has been argued (notably by Jennifer Crawford) that an absolute is attainable in the subjectivity that is part of human physiology, and thus universal, as opposed to human culture which is relative. There is an urgent need for a more informed debate here, of which Drescher presents one side with great clarity.

To return to the positive: the clarity of this book clears the ground of many myths that hold us back. I advise readers to buy it, read it and then build upon it.

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Mention here neither implies nor precludes subsequent review

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