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Spirits and Clocks: Machine and Organism in Descartes by Dennis Des Chene

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Women in Science (1994), for details on women who were born in North America. In fact, the majority of women included in the dictionary turn out to have been born in Britain. Many of these same names will undoubtedly crop up again in OUP's *New Dictionary of National Biography*, a reference work that no one is likely to fault for its lack of rigour. Haines has certainly produced an affordable biographical dictionary. However, I remain unsure as to what it adds to existing resources.

PAULA GOULD
Chester

DENNIS DES CHENE, *Spirits and Clocks: Machine and Organism in Descartes*. Ithaca and London: Cornell University Press, 2001. Pp. xiii + 181. ISBN 0-8014-3764-4. £25.95 (hardback).

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This rangy and precise book deserves to be read even by those historians who think they are bored with Descartes. While offering surprising and detailed readings of bewildering texts like the *Description of the Human Body*, Des Chene constructs a powerful, sad narrative of the Cartesian disenchantment of the body. Along the way he also delivers provocative views on topics as various as teleology, the role of illustrations in the history of mechanism, theories of the sexual differentiation of the foetus, and problems of simulation in scientific method.

Des Chene's writing is both witty and melancholic. Discussing Descartes's view of the fire in the heart as a 'fire without light', he comments that 'only in love poems does the heart glow: the real heart is a heart of darkness' (p. 27). He communicates vividly a sense that there is 'something frightening' about Descartes's brash confidence in certain of his explanations in natural philosophy (p. 34). Des Chene illustrates the schematic rhetorical role of the machine with Descartes's explanation of why one cannot attend to several things at once: the man-machine whose gaze, in a famous figure from the *Treatise on Man*, is fixed on an arrow in front of it, is prevented 'from

smelling the flower beneath its nose' (p. 73). These influential images, drawn by la Forge and van Gutschoven for the first French edition of the book, are analysed carefully and without pretension. But he also offers his own neat drawings to try to make sense of some of the more bewildering bits of Descartes's mechanistic physiology. Des Chene is far from the first to argue that in this field 'Descartes was too ambitious by half' (p. 153), but these sympathetic attempts to reconstruct obscure parts of Cartesian embryology and theories of bodily self-regulation give his subsequent criticisms extra bite.

Descartes's automata are quite unlike clocks in a number of ways. Des Chene shows us how these self-moving machines control their own operations, regulating their own motions in nested self-perpetuating cycles: the heart expands and contracts, the blood is depleted and replenished by food which, in a larger cycle, the whole machine seeks when driven by 'the movements that give rise to hunger' (p. 25). Developing autonomous 'desires', the mechanical motions of Cartesian cyborgs themselves create the conditions which cause their continuation. Even in Descartes's hopelessly gratuitous explanations of the ontogeny of machines (the generation of animals), he consistently imagines organized systems of cooperating components which are not governed by a single overseer.

So Descartes's physiology does not rigidify the body, as influential caricatures in medical anthropology and analytic philosophy of mind still tell us; rather, Des Chene stresses, it is an exercise in fluid mechanics. The body is perforated by 'an infinity of little streams', each part undergoing a constant exchange of matter with the blood, in nested irrigated systems of flux. Des Chene is happy to grant Descartes his 'postmodern credentials' on this point, and conclusively shows the error of imagining the mechanical automaton as some kind of 'wind-up toy': it is 'a body formed not from gears and levers, but from flows and resistances' (pp. 39–40).

Des Chene's brilliant account of historical shifts in notions of real and imaginary

machines might lead some readers to question the common modern assumption that mechanism and complexity are intrinsically incompatible: inert, simple, linear machines perhaps occupy only one cramped and uninteresting part of the space of possible machines. But in fact, extending and deepening the anti-Cartesianism of his inspirational predecessor Georges Canguilhem, Des Chene still concludes that the failures of mechanistic physiology were profound and conceptual, not merely practical and temporary. In rewriting Aristotle's *De Anima*, Descartes does not just radically reconstrue but finally omits the very life functions he seeks to explain.

But Des Chene's case here is unsatisfactory, resting ultimately on his refusal to drop the Aristotelian understanding of 'animate' as 'ensouled'. Only by this circular move can we understand his complaint that Descartes 'knowingly eliminated life' (p. 64), which seems just to negate without argument Descartes's clear intentions to reinterpret 'life' as independent of soul. So, according to Des Chene, Cartesian animals do not really grow, nourish themselves or see, and Descartes was aiming in natural philosophy to replace agency with his imaginary equations. It is true that Descartes suppresses Aristotle's vegetative soul, but not that he thereby suppresses its functions; Des Chene too often equates a putative mechanical reduction of a capacity with its elimination.

This is clearest in Des Chene's briefer treatments of the functions of the old sensitive soul (memory, imagination, dreaming, perception, locomotion and so on), which he tends to assimilate to reflex action. He argues that only 'the noncognitive functions of living things' are shared by humans and other animals (p. 6), thus suggesting that Descartes is trying – impossible – to replace the intricate resources of the sensitive soul with bare instinct. This cannot be right, for Cartesian animal-machines are not tied inflexibly to current stimuli alone, since the experience traced in their brains and bodies gives them considerable plasticity. Des Chene is right to note that Descartes rejected all notions of 'ancestral memory'

(p. 156), and that individual particles in body and brain 'exhibit neither memory nor foresight': but it does not follow that the whole animal is sensitive to 'the here and now alone' (p. 41). Time is sedimented in the machine by way of the idiosyncratic effects of individual history in retaining, for example, unique flexures and mouldings in the filaments of the brain through which patterns of animal spirits will flow. So automata with different histories will respond differently to the same events, and the same automaton may respond differently at different times.

But, for Des Chene, Descartes's rejection of teleology means that the kinds of 'memory', 'perception' and 'imagination' available to animal-machines (or to humans when their souls are not engaged in the process) can only be degraded and 'noncognitive'. He thus sees Descartes as banning ordinary ascriptions of intentions, aims and targets to animals: 'for Descartes, tornados and cats are of a piece' (p. 18). This is true, however, only if all representation requires ends in the strong sense in which ends require the soul: then, because cats are literally 'thoughtless' in that they have no souls and no conscious thoughts, their 'actions' would be driven inflexibly by the interaction of current input with rigid instinctual programming. But if we do not assume in advance that representation requires the teleological intervention of the soul, we can take seriously Descartes's insistence that animal-machines have genuine, though corporeal, memory.

The functions of the old sensitive soul, then, are a genuine part of the domain of Cartesian natural philosophy along with the vegetative life functions. But, as Des Chene elegantly argues in a long final chapter, the integrity of the core category of a single living organism is itself under threat in Descartes's physics. What kind of unity can an individual, self-moving animal body have in a world of merely fortuitous temporary clumpings of matter? Is the decision to study self-organizing automata merely pragmatic? Des Chene's expertise with related debates in Aristotelian metaphysics helps him pin down a set of fascinating

questions about the boundaries of the body, death, the notion of health and the nature of dispositions. 'The organism of common sense disappears', he argues again, 'replaced by an instrument whose parts are united only by something extrinsic to them, like a crowd momentarily transfixed by some spectacular event' (p. 69). Along with tantalizing scattered remarks about the later fortunes of mechanism in physiology, this kind of passionate historical philosophy makes me for one hope for swift progress on Des Chene's promised 'fuller and deeper history to come' (p. xii).

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CAROLYN RASMUSSEN, *A Museum for the People: A History of Museum Victoria and its Predecessors, 1854–2000*. Melbourne: Scribe Publications, 2001. Pp. xvi + 423. ISBN 0-908011-69-5. AU\$49.95 (hardback). DOI: 10.1017/S0007087403235044

This book traces the development of the Museum Victoria in Australia. The organization consists of two original elements, the National Museum of Victoria and the Industrial and Technological Museum, and now encompasses Museum Melbourne, Scienceworks and the Immigration Museum. The story begins, as it should, with the founding of the National Museum of Victoria in 1854 and continues almost to the present day. In the process it covers the combination, division and recombination of the principal components, the rise of new disciplines and the eventual recognition of the importance of aboriginal culture.

There are a number of parallels between the museums of Victoria and those of Bloomsbury and South Kensington in London over and above those expected from sharing common goals. The National Museum of Victoria in particular looked on the British Museum as an early role model. The description and photographs of the movement of stuffed beasts to a new home across Melbourne must induce a sense of *déjà vu* in anyone familiar with the move of the British Museum's zoological collections across London. Such similarities

continue throughout the institutes' histories but more recent times have seen something of a reversal of roles, with Museum Victoria leading the way in areas such as public access.

In tracing the story of an institute, especially a museum, one is really discussing the stories of the individuals within it, be they people or collections. The people Rasmussen considers most fully are generally from the higher castes of museum society. This is understandable since directors and figures of similar standing are most influential on a museum as a whole but they are certainly not the only ones to produce important effects. The very first director, Frederick McCoy, monopolizes almost a third of the book (and a similar proportion of the Museum's entire history). He emerges as a generally admirable man, highly energetic yet deficient in basic administrative procedures and political cunning. Such a personality probably merits a sketch rather than the full-length portrait provided. And what of the lesser and perhaps more interesting mortals who helped mould the Museum? Of these, we are told next to nothing.

The collections – the potential stars for any museum – are even harder to get to grips with. Rasmussen describes such objects as 'a still, almost mesmerising, centre' in a 'swirling sea of images and words' (p. 379) yet they are mostly mentioned only in generic terms. The philosophy behind the acquisition of items concerned with the application of science such as mining machinery and implements is clearly stated: an emphasis on the economic usefulness of collections that 'embodied "features of public instruction and usefulness" worthy of imitation' (p. 81) was of primary concern for a country striving to set itself up rapidly. The reasons for purchasing some of the non-Australian natural history and cultural collections are more obscure.

The best feature of the book is undoubtedly the forty-six self-contained pieces contributed by specialists and inserted into the main text at appropriate points. Even this is a curate's egg. Some of the pieces are merely dull; others are opportunities missed. The best, however, are very good indeed, with Rachel Buchanan

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