PART I

Animal spirits and memory traces

It would have made for clarity had Descartes and others discarded the phrase 'animal spirits', since it was difficult to disinfect the words of connotations wholly at variance with the assumptions of their physiology.

(Albert Balz 1951: 54)

The history of parallel distributed processing has itself been a case of parallel distributed processing. (Elizabeth Valentine 1989: 355)

The descendants of Descartes comprise both theoreticians and fantasists; but Descartes himself is neither one nor the other, for there was no structure in 1640 that could prise and hold those categories apart.

(Catherine Wilson 1995: 34)

Introduction

The two long chapters in part I introduce my central themes, suggesting the virtues and pleasures of superficially silly old theories. Chapter 2 outlines the long background of animal spirits theory, questions the assumption that spirits were inevitably detrimental to the development of sciences of brain and mind, and describes strange 'pre-modern' human bodies, filled with turbulent fluids and rummaging spirits. In chapter 3 I reinterpret Descartes' 'philosophy of the brain'. Descartes used animal spirits flowing through brain pores in tentatively suggesting a distributed model of memory employing superpositional storage. I defend this anachronistic reading against four strong objections, and articulate surprising conclusions about dynamics and the body in Cartesian mechanism. This model of memory was much less common than animal spirits theory, which most accepted.[1] But its historical influence was powerful, as I show in part II.

Animal spirits, those 'ultimate oxymorons' (Krell 1990: 5), were neither animals nor spirits. Coursing through brain and nerves, they long remained candidates for the role of bearers of neural information: in philosophy, neurology, and medicine, this old physiological psychology was still all but ubiquitous in the early eighteenth century. Here is a first example of how spirits operate in remembering, which reveals how they were 'terrifically personified' (Rousseau 1989: 41) as contrary agents causing discomfort to the self in bewildering internal environments. A character in popular dialogues by a literary physician (Mandeville 1711/1976: 130) describes how animal spirits, 'volatil Messangers' seeking images 'from the dark Caverns of Oblivion' in the brain, will roam 'flying through all the *mazes* and *meanders*', and 'rommage the whole Substance of the medullary Labyrinth, whilst others ferret through the inmost Recesses of it with so much Eagerness and Labour, that the Difficulty they meet with sometimes makes us uneasie'. This indicates how spirits touched feeling as well as theory, in odd early modern experiences of uneasy innards. What some lament as 'confusions and contaminations' across discourses and levels

1 Spirits theory did not *entail* distributed representation: many who had quite different accounts of memory believed in animal spirits, while Hartley did not use animal spirits in his detailed distributed model (chapter 13). Distribution is conceptually independent of its specific physical instantiation. Yet there were looser suggestive connections: even those who officially attacked distribution often described the workings of animal spirits in terms of superposition and interference.

of explanation involving the spirits (Walker 1984: 223) can instead be seen as rare proximity between theory, culture, and phenomenology. The bodies in which spirits flowed are quite alien to us: the 'kinesthetic model of oriented flows' (Duden 1993: 85) was both hypothesis and lived reality.

I follow Gary Hatfield (1995: 185–6) in assuming that 'psychology' was as much a 'natural science' as any other by the seventeenth century, once we reject a false dichotomy between metaphysical conceptual work and truly scientific quantitative experiment. Theories of memory, for instance, were often independent of theology and yet were closely connected to deep concerns about self, society, and the past. The web of discourses around memory and brain was fruitfully extensive, the language of spirits theory spreading easily from feelings to fibres, pores to passions, between personal and subpersonal psychology. Spirits' liminal status, 'uncertainly poised between the medical and the metaphysical' (Myer 1984: 104), seems more enabling when we acknowledge a need for our own psychological theories to spread again, to encompass wider explananda and constraints. Cognitive science can no longer retain immunity to the subpersonal or to the social: stress-related hormones like epinephrine intensify the power of traumatic memories (Schacter 1996: 214–17), neuropeptides are coupled with context (Levin and Solomon 1990). Hanging round old texts and recalling the strangeness of our own cultural past, animal spirits help us listen to urgent old debates about the relations of body and self which customary historiographies have drowned out.

The outstanding scholarship on ancient, medieval, and Renaissance spirits theories on which I draw in chapter 2 is not matched for spirits in early modern science or culture. Knowledge of earlier, more holistic physiological traditions implicitly licenses an easy but false assumption that animal spirits disappeared during the rationalising scientific revolution of the seventeenth century. I discuss Descartes' spirits at such length not just to analyse his puzzling model of memory, but to query his talismanic place in philosophy and cultural studies alike as the demonic source of modern alienation. The permeation of psychology by context, culture, and body which spirits promoted (chapter 2) did not cease with the sudden fracture of self from matter with which Descartes is supposed to have urged on new scientists to master and possess passive nature. Mechanistic bodies are *also* dynamic (chapter 3).