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How to Connect with the Past

John Sutton, *Philosophy and Memory Traces: Descartes to Connectionism.* Cambridge: Cambridge University Press, 1998. Pp. xvii + 372. A$125 HB.

By Catherine Wilson

John Sutton's *Philosophy and Memory Traces* is two books in one, a historical study of physiological conceptions of memory from Descartes to Coleridge, and a study of the moral-political dimensions of theories of the self. Sutton argues that memory posed both a modelling problem and a moral problem. If experiences were physically imprinted on animals, as by block or stamps, how could such traces remain in the 'loose pulp' of the brain? How could they be retrieved voluntarily, or, for that matter, involuntarily? Memory seemed to require two selves, one to be a museum (or, before the museal age, a 'treasure chest'), the other to be its curator. The curator stored everything important and exhibited it, after a bit of rummaging. Admittedly, the curator

put on some bad shows. Important pictures went missing and material in bad taste was sometimes prominently displayed. But this recognition led to problems; it implied the existence of a third self whose knowledge of the stock and judgement were superior to the curator's. It was all very puzzling.

Enter the animal spirits into Cartesian physiology. Scornful of little pictures in the brain, Descartes knew that it was patterns of activation that were read or experienced as having intentional or real content. The spirits were ready to help. From ancient times, they had been conceived as liminal beings, neither material nor immaterial, active, mobile and free, roaming through the body, yet constrained by its vessels and solid parts. Cartesian softened: thanks to the animal spirits, we were not just puppets or clockwork. The active, flickering of intelligence and awareness was projected into them, and read out again as an explanation of mental liveliness. Like little tongues of invisible flame, the spirits danced through the animal machine linking it to the airy, fiery, and even quintessential aspects of the cosmos. Psychological equilibrium and the sense of well-being depended on well-behaved spirits. Turbulent flow, the seepage of escaped vapours, too little or too much mobility, brought about various pathologies. The spirits made memory possible by folding, enlarging, bending, and arranging 'brain fibres' in ways that constrain their own flow (p. 57). Once bent, opened, or folded, brain-structures are more easily re-bent, reopened, and refolded. Sutton shows in this connection how much of the standard interpretation of Cartesian dualism is untenable and irrelevant (p. 53). Descartes' systematising does not involve a wholesale rejection of intermediate entities, nor is it magisterially unconcerned with the body, nor does it depend on a notion of matter as 'passive' and 'inert'. "Philosophers' alleged subduing, murder, and forgetting of the human body, their neglect of the microprocesses of human nature, was not a significant seventeenth-century phenomenon." (p. 94).

Descartes' contribution to explaining memory, according to Sutton, was to see the potential of the notion of superposition for accounting for the storage of many memories in a small space (p. 94). Superposition, as represented by the parallelogram of forces, was a discovery of Galileo's: a second motion is laid down over another motion to account for the empirically-observed motion. Two things act in the same place yet can be re-isolated. Thus apparently chaotic phenomena may represent numerous levels of superimposed regularity. When Descartes compared corporeal memory to a piece of paper that has been folded and refolded, and falls naturally into a certain shape, or to a piece of cloth with multiple holes punched by an embroiderer's device (p. 59), Sutton argues, he had something like a 'distributed' model of memory in mind. A 'single'

memory could correspond to folds running all through the head, or pores activated in various parts of the brain. At the same time, Descartes saw that his models seemed to make error—noise, ambiguity, distortion—inevitable. Malebranche understood this consequence, and so did the English, who developed their own versions of animal-spirit and superposition theories.

The moral problem was clearly visible: self-censorship and reliability demanded the disciplining of the animal spirits. But one might as well try to tame the wind or flame, and an immaterial soul was not an ideal candidate for the role of *dirigiste*. Descartes thought that the animal spirits could be trained by inculcating habits of association. But, in the long run, Sutton argues, moral man required the elimination of the animal spirits, and only moral man had the credibility to call decisively for their repudiation. Already Harvey knew that there were no spirits in the nerves, and no trace of nervous fluid had been identified in the 'inflated' muscle or the nerves, as Swammerdam and Steno were fond of pointing out. But an "inability to see or measure postulated entities could be regarded as irrelevant to their existence; modesty about human sensory limitations was in order" (p. 186). By contrast, the moral argument against spirits appeared decisive; and Reid and Coleridge argued that their existence was incompatible with moral agency. Sutton argues that the disenchantment of the world picture has more to do with the triumph of moral man in this respect than with the 'materialistic' approach to the animal body "[t]he soul imprisons the body not on publication of the *Meditations* but as control of truth in memory assumes a deeper ethical urgency . . ." (p. 118). The eighteenth century might wonder at its enthusiasts, visionaries, hysterics, and charismatics, but 'Man' was normatively distinguished from all such airy and vapourish persons. Only the poet was permitted to offer up, in aesthetic contexts, his casual, subjective associations and his overwhelming involuntary impressions, and even the poet was soon to be eclipsed in prestige by the novelist. The novel substituted consistency of character and the plotted narrative for the confused, hopelessly meaningless past of Renaissance autobiography and fable (p. 202).

In the meantime, according to Sutton, alarm over the animal spirits and the implications of Cartesian memory had come down to "strategies of evasion, ways of re-asserting control over the wayward body" (p. 100). It is well known that Locke's theory of identity attempted to provide a substitute for philosophically-threatened immaterial substance as the subject of moral agency and the object of divine reward and punishment. Sutton points out that Locke's psychological criterion was also a response to be posed by those who "would place thinking in a system of fleeting animal spirits" (p. 171). "Longing for inner discipline springs in part from an

awareness of the dangers of distributed memory and the fragile authority of a central executive . . .is the only security" (p. 100). A normative or nostalgic wish concerning how our memories should succeed one another and should be subject to orderly voluntary recall was expressed by the English physiologists. Digby, Boyle, and Hooke all retreated to local storage. Hooke set his memories in little cells, assuring us that "not two of them can be in the same space,. . .but they are actually different and separate from one another" (p. 137). Good microscopists all, they see no difficulty finding "room" in the brain for even "100 Millions" (Hooke) of distinct memory-ideas.

Sutton argues that distributed models offer a philosophically superior alternative to storage theories. Yet they generate the same moral anxieties now as they did in the eighteenth century. Jerry Fodor argues that 'associationism' historically made it impossible to "get a *rational* mental life to emerge from the sorts of causal relations among thoughts" (p. 236). In Fodor's characteristically elegant and precise language there needs to be a "central integrator guy" to "solve Gall's problem about what puts the peripheral stuff together" (pp. 236–7). Sutton plausibly relates this demand for a 'central executive' to Fodor's worries about "relativism", which Fodor sees as a movement increasingly spreading its menacing tentacles throughout philosophy, thereby "affronting intellectual dignity" (p. 237).

Stuart Hampshire too requires *a priori* a 'thoughtful self', a 'supervisory self', exercising 'overlordship'. One of Sutton's aims is to persuade philosophers to give up their idol-worship and to try harder to develop models of consciousness, attention, and awareness that do not make use of a tripartite model involving pictures ('ideas') viewed by something ('the subject') and portraying things or events occurring outside ('objects'). Attacks on this confused and reduplicative triplex are familiar, but, unlike the familiar direct realist, who proposes to eliminate ideas in favour of subjects and objects, Sutton thinks it is the subject who is the supernumerary member of the trio. We say "I perceived . . . I thought . . . I did . . . I remember", but the real story is this: a dense body without any hollow repositories moves amongst other bodies and responds to features of its environment well enough to ensure its survival. This body is modified in ways we call 'learning'. There is a real world, of which our bodies are part, and there are traces, "patterns unfolding through time in complex causal relations with the world and with each other. And that is it. . ." (p. 278). Sutton appears mildly tempted by the Gibsonian view that memory is just continued apprehension of the environment, the past somewhat occluded by the 'edge' of the present (p. 284).

Sutton's book is not an easy one, but it is written with intensity and concentration and is never dull or obscure. It is difficult principally

because it incorporates historical material, secondary and interpretative works, post-war Oxford and Cambridge-style 'philosophy of mind', post-modern theory, social philosophy, and Massachusetts-style neuro-cyber-philosophising. Few readers, and certainly not this reviewer, will have a thorough acquaintance with the range of literature employed. It is difficult to tell from Sutton's exposition whether Descartes' theory of corporeal memory really has interesting similarities to currently-available distributed models, or is merely a vague gesture of rejection of local, iconic storage. This part of the argument goes by very fast, and the exposition (on pp. 19–20) is not all that helpful; the deficiency could easily have been remedied by supplying another five pages of explanation and a few diagrams.

A second weakness of the early chapters is that a stronger empirical position on the fallibility of memory is taken than is needed to sustain the book's overall theses. What do we actually know about the reliability of memory in general? Truth and confabulation are issues that have been highly politicised in debates about 'false memory syndrome', but the jury is still out. First-person subjective assessments of the excellence of memory are of little use, and it has been shown experimentally that false memories can be induced in susceptible subjects when they are told by credible witnesses what they are supposed to know. Nevertheless, many experiments purporting to demonstrate the unreliability of memory, for example those involving tasks requiring the subject to remember whether he has seen a word in a list already, do not address spontaneous autobiographical memory of events at all. First-person assessments of autobiographical memory as poor are also marginally relevant. Even if autobiographical memory eventually turns out to be somewhere in between "pretty good" and "astonishingly accurate and comprehensive", this will not diminish the need for a better ontology than the old triplex provides, or make moral anxiety about selfhood and agency less intelligible. It is not only gaps and losses that trouble us; accurate memories too may be unwelcome, distressing, and difficult to integrate with one's present.

These criticisms aside, *Philosophy and Memory Traces* is both a fascinating and important book, methodologically and substantively. In addition to a broad and thoroughly revisionary interpretation of Cartesianism and the 'death of nature' problem, the reader will find a wealth of illuminating remarks about poetics and physiology, conceptualisation in science, and theory change. Sutton moves easily back and forth between physiology and cultural studies and sensitises the reader to the ubiquity of discourses of self-government. As philosophers used to think that the personal resurrection was a datum their metaphysics needed to account for, so, in some sectors of contemporary philosophy of mind, human moral-mental omnipotence is treated as a datum that must be elaborated and validated

in psychological theories. This is an original and adventurous book, forcefully written, and worth multiple re-readings. It will encourage historians to think differently about the possibilities inherent in their materials.

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By Michael Mascuch

History with Trouble in Mind

In *Philosophy and Memory Traces*, John Sutton presents a cogent, informative, and stimulating 'defence' of 'animal spirits' theory and its legacy in philosophical debate on the nature of memory since Descartes. As such, his book may find company among the growing number of works in philosophy and cognitive science popularising what I recently heard my Berkeley colleague John Searle describe as "sane philosophy", that is, a philosophy that regards consciousness as, to quote Searle again, "an ordinary biological process". Yet *Philosophy and Memory Traces* is as much a work of cultural and intellectual history as it is of philosophy and cognitive science: indeed, it utilises both historical and philosophical argument in an attempt to, as Sutton puts it, "undermine logicist overconfidence in the 'natural order' of cognition and memory" (p. 18). The commingling of history with cognitive science sets *Philosophy and Memory Traces* apart from its would-be peers in the sane philosophy camp, who present their cases, for the most part, from within the confines of wagons circled tight in defence of science against reckless and menacing fantasists in the humanities. In particular, Sutton's approach affords a very different prospect of Descartes and his intellectual inheritors from that which Searle and his companions prefer, since they tend to look upon the advent of Cartesian dualism as the inauguration of the reign of philosophical insanity on the matter of mind. One great strength of Sutton's book therefore is its deliberate disruption of traditional teleology and disciplinary barriers in order to complicate the long debate to the advantage of its position, while remaining judicious and incisive in its presentation of and commentary on key ideas.

According to Sutton, if cognitive science—or 'neurophilosophy,' as he sometimes calls it, following Patricia Churchland—is to make meaningful

contributions to knowledge, especially on vexing issues such as the relation between self and psychological control, which Sutton takes as the warrant for his investigation, framing it as a problem of autobiographical memory, it must proceed by embedding its subject matter—mind, brain, and memory —in history and culture. With this warrant on the table, Sutton looks up the will to power bound up in neurophilosophy's long-standing adherence to the idea of total recall. The purity and accessibility of memories, as well as the cognitive discipline, autonomy, integrity, and responsibility of self, entailed in a capacity for total recall are, according to Sutton, characteristic of the 'local' or archival models of memory that have enjoyed hegemony in the modern period. Opposed to these are 'distributed' or reconstructed models, which treat memory as blending patterns in shifting mixture. Distributed models, such as the 'old' animal spirits theory and the 'new' connectionism, describe dynamic cognitive systems that are complexes of continuous, simultaneous, and mutually determining change, allowing for little in the way of apparent cognitive order and the autonomy, stability, integrity, and responsibility of self to which moderns seem so attached. It is perhaps because of their disruptive potential, their failure to support notions of executive control over memory, the roots of which run deep in modern social and cultural practice, that distributed models have been unfavourably regarded by modern philosophy as wanton notions.

Sutton's modest proposal, to link cognitive science with history and culture, can thus be read as a means of bringing these black sheep back to the fold; first, by legitimating them with a secure place in the history of neuroscience, which they have thus far been denied; second, by showing how the philosophical marginality that distributed models have endured is much more a product of social and cultural forces—ideology—than of any logical or empirical flaws in the theories themselves. Furthermore, the cultural and historical context he recovers succeeds in making familiar rationalist arguments in favour of cognitive control of memory appear rich and strange. In Sutton's view "[r]egularity, order, and coherence in memory and cognition are fragile, temporary achievements: no less real for that, but more rare, less common, than we think" (p. 321). Local models, which often are treated by philosophers and cognitive scientists alike as mundane universals, are therefore made to seem oddly convenient to the modern West.

Cognitive Control

This result points toward the need for an elementary historicisation of the model of local memory and its corollary concept of self as the locus of

executive cognitive control, an undertaking Sutton appears keen to endorse. Nevertheless, his own historical priorities lie elsewhere. The main beneficiary of Sutton's investigations is the current philosophical scapegoat Descartes, who appears in the longest chapter of *Philosophy and Memory Traces* surprisingly and heroically enough as an early theorist of superpositional and reconstructed memory. Descartes' writings on animal spirits, memory, and the brain were part of his extensive work on the many capacities humans share with other animals, which comprise his now neglected ("repressed" may be the more appropriate term) psychophysiological treatise *L'homme* (commenced in the 1630s, first published in the 1660s). Sutton closely reads its sections on corporeal memory alongside Descartes' correspondence, to reconstruct a rudimentary distributed model of memory that will serve the argument of *Philosophy and Memory Traces* as a kind of distant forbear of new connectionism. This aspect of Descartes' philosophy has received little attention from modern philosophers and intellectual historians, who prefer to focus instead on his concept of intellectual memory—originally, to praise it; now, increasingly, to disdain it.

In Sutton's account, of the two kinds of memory that Descartes conceptualised, the intellectual and the corporeal, the corporeal memory of *L'homme* was of far greater interest to his contemporaries, both those who supported and those who criticised Cartesian philosophy. In seventeenth-century English natural philosophy especially, Sutton explains, Descartes' corporeal memory became a subject of intense debate. Moreover, the debate exhibited a resistance of the sort that continues today in philosophical critiques of connectionism, such as that of Jerry Fodor and other contemporary anti-associationists. The present-day critics and the early resistors —Sutton considers responses, from the pens of Kenelm Digby, Henry More, Joseph Glanvill, Robert Hooke, and John Locke, spanning the period from 1644 to 1682—share with later critics such as Thomas Reid (*Essays*, 1785) and Samuel Taylor Coleridge (*Biographia Literaria*, 1817) a moral horror of distributed models that merits attention, Sutton argues, both for the new light it sheds on the philosophy of memory in general and for what it reveals about the scientific basis of local models and cognitive control. It is the latter of the two considerations that interests me, a cultural historian of the early modern period, most, for it provides a useful entry point into the question of historicising local memory and executive control.

What made the English anxious about Descartes' corporeal memory was, Sutton explains, its fragility of authority over impression and recollection, which appeared vulnerable to fluid material processes that were unconstrained by the soul. The following passage, which Sutton quotes from Joseph Glanvill's *Vanity of Dogmatizing* (1661), epitomises the early modern worry:

> And how is it conceivable, but that carelessly turning over the Idea's of our mind to recover something we would remember, we should put all the other Images into a disorderly floating, and so raise a little *Chaos* of confusion, where Nature requires the exactest order. According to this account, I cannot see, but that our *Memories* would be more confused then our Midnight compositions (quoted on p. 139).

The feared result of Descartes' model of corporeal memory with its transient animal spirits was, apparently, psychological chaos. It is enough for Sutton, whose principal concern in this segment of his book is to establish the importance of an underrated idea of Descartes, to remark the anxiety of Glanvill and his fellows, and no more. For example, noting that Glanvill cites the Christian myth of the fall as the beginning of human imperfection, Sutton comments that "Glanvill's belief that human remembering is *not* a matter of confused, disordered, chaotic motions is not simply a description of indisputable explananda. It can be read, rather, as a normative or perhaps nostalgic wish for how our memories *should* orderly succeed one another" (p. 141).

As damaging to Glanvill's pretence to logic as it is, Sutton's acute assessment supplies little in the way of historical context for Glanvill's anxiety. Moreover, it stands somewhat at odds with the account Sutton offers for the allegedly similar "distaste" (p. 130) of Glanvill's compatriots, the basis of whose anxieties Sutton explains in the following group diagnosis:

> It is not surprising that memory should have increasingly preoccupied English philosophers during the seventeenth century. The obsession with order after the Civil War; and after the Interregnum's uncontrolled multiplicity of opinion, produced not only impositions of unity in worship, dress, and conduct, but also attempts to keep the past in place. Both collective and cognitive memory had to display unity and concord, even at the cost of imposing false continuities on the political and personal past, by developing clear narrative structures to organize events. A fixation on sameness required external discipline to be applied as much to internal, potentially anarchic, psychophysiological flux as to unruly social forces (p. 132).

This is an interesting notion, but Sutton fails to supply the historical analysis needed to support it. However, there is good reason to doubt its adequacy as a social and cultural explanation of the English resistance to Descartes' corporeal memory. While the Civil Wars and their aftermath,

the Restoration period in particular, exhibited a heightened concern for the social and cultural practices Sutton cites in this passage, both the structure and integrity of memory, and the narrative control of the past, had been matters of English, and for that matter of non-English, preoccupation for some time. Moreover, and perhaps more importantly, despite recent attempts to paint some members of the Royal Society as politically alienated intellectuals, the case remains speculative, as it relates to the memory debates. Thus the ideological basis of the early modern 'moral' revulsion toward cognitive disorder appears in Sutton's work as an important but vaguely formulated hypothesis.

This is, however, hardly a significant flaw in Sutton's ambitious, carefully researched, meticulously presented, and subtly argued book. Like any seriously provocative scholarship, *Philosophy and Memory Traces* raises several important issues that, as the author candidly admits more than once, require wider and deeper contextualisation than he is able to offer. A review essay such as this is hardly the place to undertake the further study that Sutton calls for. Yet I cannot resist the temptation to respond by speculating somewhat with a view toward constructing a supplementary account of the English response, one that pays attention not to religion and politics but instead to material culture—print culture, in particular, and the specific trouble it may have caused for early modern memory theorists such as Glanvill and his friends.

A Quandary of Memory

In the passage from Glanvill quoted previously, we learn that in mental recollection "[n]ature requires the exactest order". It is no wonder that Glanvill was horrified by unruly spirits disrupting his memory, if this idea carried any conviction. We might therefore begin by asking, what is the empirical basis for such a claim about the nature of the mind and (for it begs this one too), about the nature of nature? Certainly not mundane experience, which, Sutton persuasively demonstrates, yields no such impression of organisation. One possible alternative, which *Philosophy and Memory Traces* has not room to address, is that nature apprehended as an object of scientific investigation requires an 'exactest order', for as such nature is rendered an object not of spirited chaos but of the focused precision of graphic representation. When one encounters 'nature' in, for example, a work of scientific research such as Glanvill's friend Robert Hooke's *Micrographia: or Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses* (1665), one confronts nature in the guise of an unnatural exactitude, in a hyper-real specificity and superfluity of

depiction and description that seduces and dominates the imagination, if only because the result is so unlike the relatively less excessive and organised perspective afforded by empirical experience, with its obstructions, instabilities, and general tendency to disorder. Seventeenth-century texts of empirical observation and analysis such as Hooke's (some of the best known of the others include the writings of Boyle, Newton, Galileo, and Descartes) originally and literally constitute the world of modern science, and of so-called 'objective knowledge', as an effect of obsessive documentation.

Thus, Glanvill's notion of nature's requirement, we might imagine, is at least as much a symptom of his participation in scientific culture, which was, in his day, a culture of graphic representation—of words and, increasingly, images—in print, as it was of his religious beliefs. The objective knowledge enabled and disseminated by documentary evidence offered the fullest and most exact order available to Glanvill, and his consciousness of nature was framed (in the sense of being both enabled and constrained) by it, rather than by his direct experience with the natural world itself. On the contrary, the very possibility of his knowing such a thing as 'the natural world itself', unmediated by graphic representation, was impossible, for writing and related representational technologies strongly influenced his subjective orientation to the objective world. To an early modern natural philosopher like Glanvill, *Micrographia*'s representation of a 'louse' posed a greater intellectual challenge than the louse occasionally inhabiting his scalp: while the presence of the latter in its natural habitat was the elusive subject of superpositional memory and indeed even strategic forgetting. The former, like all of its kind, appeared as an object of accurate *recognition*, of a 'natural knowledge' of identification, which seemed to require, at least in the early days of modern scientific research, discrete memory traces and recollection of the most precise and exact sort. In other words, it would appear necessary (if not 'natural') that nature required exact order of any mind that believed itself capable of knowing 'nature' as it appeared in books. I think it is therefore appropriate to consider a kind of quandary of memory occurring in the last third of the seventeenth century, in England in particular, resulting from the proliferation and dissemination there, under the aegis of the Royal Society, of unprecedented texts such as Hooke's, which were archival representations of the facts of the world, occasioning for some readers a dizzying fantasy of total mental comprehension, a fantasy that apparently remains powerful for some even today.

The advent of documentary texts may have precipitated a memory perplex by posing a new and extreme challenge to memory practice in two respects. On the one hand, the proliferation of all manner of books,

especially the many claiming in their titles to offer a 'true and exact account' of an event, person, or thing, presented early modern intellectuals with whole realms of 'natural knowledge' whose vastness was fascinating but also overwhelming for minds to assimilate and assign to memory. On the other hand, these new virtual worlds, possessing no objective reality of their own except as the specific effects of written discourse, necessitated a literal or verbatim mode of comprehension that was both new and in some instances difficult to perform, since it had no basis in the ordinary or familiar confusion of the traditional knowledge and memory practice rooted in oral culture, but relied instead on the precise formulae and syntax of what Roger Chartier calls "the order of books". Because it was still new, the order of books was a most exacting system of comprehension to master in the early modern period, in the same way that the precision required of data-processing bedevils many otherwise literate computer users today. Consider the 'trouble' expressed by Samuel Pepys, a member of the Royal Society and a dedicated and accomplished natural scientist, upon reading Robert Boyle's *Experiments and Considerations Touching Colours* (1664): Pepys wrote, "some part of it, endeed the greatest part, I am not able to understand for want of study". The book was, he discovered, to his apparent humiliation, too 'Chymicall' (28 April, 3 June 1667). His failure to comprehend the work may have been especially frustrating, since Boyle wrote that he designed the work, "not barely to relate [the experiments], but...to teach a young gentleman to make them" (quoted in Shapin and Schaffer 1985, p. 59). Not only did seventeenth-century natural knowledge require a still quite novel cognitive command of the linear and hierarchical syntax of writing and printed texts, it also in some cases required mastery and application of supplemental codes that were in themselves abstract orderly systems. Unruly animal spirits, it is apparent, were incompatible with cognition of this sort: they simply weren't conceived with the kind of capacity, of memory and executive control, which the new graphic form of objective natural knowledge required in mind.

Bound to Words

It may perhaps be objected that my account fails to appreciate the technological function of books as a form of 'external aid' to memory. There are at least two common conceptions of this function: the medieval one of the book as a mnemonic device prompting the mind to recollect what it already knows; and the one closer to us, of books as encyclopaedias or

archives containing data we don't bother to memorise, because we know that we can turn to such texts for help on a need-to-know basis. Both functions could, it seems likely, have relieved the early modern mind of its trouble storing and remembering the difficult abstract material of objective knowledge, and thus dispel the clouds of concern I have attempted to gather around it. Surely Pepys, Glanvill, *et al.*, possessed one or both of these understandings of the book as a help to memory, which would obviate their worry over total recall?

In the case of the instrumentality of the book as an archive, the evidence to support this function is weak. It must have been difficult to treat a book as an easily identifiable and searchable database with much efficiency if the state of early modern book formatting (especially indexing), library organisation, and cataloguing is any indication. The seventeenth century seems to have been a period of transition in this regard. Most folios and many other kinds of books attempted to provide something in the way of a table of contents, but few had indexes, and those that did often had misprints in the sequence of page numbers. Hooke's *Micrographia*, for example, which Pepys owned and deemed "the most ingenious book that I ever read in my life" (21 January 1665), contained a paginated table of contents (identified as "The Table") listing each thing observed, and occasionally the details of the observation, but not with consistency; it had no index. Of course some book owners prepared their own indexes for texts they might attempt to use as works of reference, but such instances were unconventional, and the results idiosyncratic. Book storage and cataloguing practices were equally inconsistent. Book size rather than subject-matter often dictated where a text was placed on a shelf or entered in an inventory. Over the course of the century all kinds of printed books became more user-friendly, in the sense of being more accurate and uniform in format and presentation, but the library remained fairly haphazard in plan and therefore unhelpful to those unfamiliar with it. Books such as *Micrographia* were archives of fact, but they arrived on the scene a bit in advance of an apparatus enabling them to be efficiently utilised as such. The idea of the book as a universally searchable database required further formal and technical developments in order to emerge fully into being.

We are left, then, to consider the value of a book as a mnemonic device. If we take some statements made by a few early modern natural scientists at face value, this function would seem to present a viable consideration. Hooke, for example, invokes the idea of writing as a memory aid in his preface to Moses Pitt's *The English Atlas* (1681), where he explains that cartographic texts, like other graphic descriptions of physical entities, displayed:

> [t]he true order, figure, and proportionate magnitude the things themselves hold the one to the other that so exhibit a true Representation of the Universe and its parts to the fantcy and mind of men. It may also the more easily imprint the Idea the deeper in the Memory which is the principal use of such a Work. There being nothing more conducive to the assistance of the understanding and memory than a plain simple, clear and uncompounded representation of the Object to the senses (preface).

Yet on closer inspection this passage implies something else: the atlas cannot serve as an *aide-memoire*, since what it exhibits is the very thing to be remembered. Instead of a memory aid, the book is the memory master, the original which the mind must somehow maintain in its totality, preserving an exact or "plain simple, clear and uncompounded representation" of "the true order, figure, and proportionate magnitude the things themselves hold the one to the other", as if it were a facsimile of the printed page. To be sure, metaphors of inscription and imprinting had been used to describe mental receipt of sense data—'impressions'—for centuries, but rarely if ever had memory been thought to look like a book. Memory was a place, a building, a collection of some kind, but not a printed text. However, a book is the memory model implicit in Hooke's characterisation of the utility of the atlas. This is the case, of course, because the 'Object' depicted by Pitt's *Atlas*—the parts of the universe, or more precisely the idea of the true relation between the things of the universe—had no existence except as a representation, a drawn or engraved image. The *Atlas* did not contain a mimetic image of the universe. Instead, the *Atlas* was the medium by which Pitt's subjective concept of the universe was produced as an object of 'true'—that is, scientific—knowledge. In order to truly know this universe, memory had to represent the representation precisely as it materialised in the pages of Pitt's book.

Except in Locke's *Essay Concerning Human Understanding* (1690), in which the mind is figured as 'white Paper', painted upon by 'Fancy' (II.i.1), the early modern English concept of memory as a textual simulacrum almost always remained an implicit notion, not an explicitly formulated model. But we might regard such implication as the spectre haunting natural scientists as they attempted to communicate their discoveries with each other. Natural knowledge of the objective world is a figment of geometrical projections, figures, schemata, texts—the stuff of graphic representation. To manipulate graphic texts effectively, to have any hope of preserving their 'truth', one is obligated to acknowledge and maintain a precise order within and among them. For all kinds of reasons, some having to do with

the body's physical capacities (for example, the way memory actually operates), others having to do with the limits of technological evolution (for example, the state of written prose, the printing and design of books), *etc.*, this proved to be no easy task in the seventeenth century. Robert Boyle, for example, expressed despair at the failure of others to replicate his experiments with the air pump. Anyone who set about trying to replicate his work—his minutely detailed pictorial and verbal descriptions—Boyle discovered, found it "no easy task" (Shapin and Schaffer 1985, pp. 59–60).

Given their obsession with documentation, to think and communicate together, to inscribe new worlds as extensions of the known, Boyle, Hooke, Pepys, Glanvill and their friends together confronted a growing imperative to practise a more elaborate form of what Medieval preachers called *memoria ad verba*, as opposed to *memoria ad res*. But *memoria ad verba* put memory at risk in ways that *memoria ad res* did not, as a Medieval treatise on preaching suggests:

> Words easily pass out of the memory, and from such a trivial action, the memory of what one is saying is disturbed, because words, more readily than concepts, fail to hold together. Often, from forgetting a single syllable, one forgets everything. Thus, the preacher can be confounded because he has bound himself to words rather than to their gist (Thomas of Waleys, *De modo componendi sermones*, c. 1342, quoted in Carruthers 1990, p. 89).

The responses to Descartes' animal spirits of Glanvill and his ilk, all of whom used books to think as well as to speak, can be described as symptoms of their being, in Thomas of Waleys's phrase, bound to words. Their relatively new and rapidly expanding literal universe seemed absolutely to require a model of memory that featured discrete local storage and the most authoritarian executive control.

The 'true and exact' description of things, however celebrated it was in the titles of seventeenth-century books, could also at times drive readers insane, especially so long as such readers anticipated a direct correspondence between memory and objective reality, or the chaos of experience and the order of print. This was especially the case with the matter of mind and memory, for among the facts of nature writing makes available to knowledge is the idea of one's own obliviousness. In the seventeenth century, while it may have been exhilarating to discover the new worlds of objectivity in writing, it apparently was also troubling to encounter therein so many signs of one's cognitive disorder. The response to this bad news was not to blame the messenger, writing, as Plato had done in his *Phaedrus* (by the seventeenth century script and print had become far too useful

for that, and there was no turning back), but rather to enact a kind of repression of which the English response to Descartes' corporeal memory was a symptom. If this hypothesis is plausible, the next problem Sutton prompts us to solve is the mystery of why the fantasy of total recall still haunts our 'advanced' science.

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By Theo C. Meyering

Introduction

John Sutton's book is a work of high scholarly attainment, spanning a wide range of topics requiring different kinds of academic expertise, an intellectual pleasure for historian, psychologist, and philosopher alike, not the least because of its intriguing, not to say provocative, thesis. Indeed, Sutton's book has a three-fold focus: first of all it aims at descriptive historiography of psychology and philosophy. Both internal (rational) and external (cultural-historical) influences are taken into account to portray the dynamics of theory development in the domain of early and modern memory research and theorising.

In addition, however, the book can profitably be regarded as a historiographical specimen in the tradition of Lessing's *Rettungen*. For the second challenge the book is trying to meet is nothing less than to rehabilitate a much neglected if not ridiculed part of Cartesian philosophy, namely Descartes' theory of animal spirits rushing through the hollow nerves and acting, *per impossibile* (such is the received opinion : Krell refers to animal spirits as those "ultimate oxymorons" [Krell 1990, p. 5]), as intermediaries spanning the unbridgeable chasm between Cartesian body and mind. Yet, notwithstanding the intellectually defiant course that Sutton's main argument is bound to take given its rehabilitative objective, his treatment of opponents and of critical material is admirably even-handed.

In the third place, finally, Sutton's book also includes a *systematic* defence of a theory of memory traces, widely deemed to be refuted among modern philosophers of a Wittgensteinian bent as well as among direct realists invoking Gibsonian psychology. Thus the book is certainly recommended reading for all those who believe that good history of philosophy should be good philosophy *simpliciter*, if only in the minimal sense of being

philosophy teaching by example. Moreover, Sutton writes in a captivating style, with flowery, yet remarkably regimented, prose, although on a few unfortunate occasions the diction stretches from the beautifully economic to the forbiddingly dense to the downright enigmatic.

The two central themes of the book are, first, that the theory of animal spirits has a long history and that, notwithstanding the derision it has been abundantly exposed to, it has not at all entrammeled the progressive development of the mind/brain sciences (p. 23). On the contrary, Sutton goes on to argue that Descartes' animal-spirits flowing through brain pores suggested a surprisingly 'modern' distributed model of memory employing superpositional storage! This model was much less common than plain animal-spirits theory, which most contemporaries accepted. Yet it is clear from critics and followers of Descartes alike that this was the way Descartes' philosophy of the brain was interpreted during the seventeenth century (pp. 23, 65). Thus this aspect of Descartes' philosophy did not initially go unacknowledged. On the contrary, it had a definite historical influence. It is safe to conclude, therefore, that there is a much longer background to dynamic views of memory than is commonly acknowledged (p. 15).

Methodology

Sutton boldly defends this admittedly anachronistic reading of the Cartesian corpus (pp. 15, 23, 155) against several major objections. Yet his hermeneutic stance raises profound questions of historiographical methodology. Should intellectual history be described only in terms available to the historical subjects themselves, thus sticking to a narrowly positivist, yet widely applauded conception of historiography in the tradition of Ranke's adage to write history "*wie es wirklich gewesen ist*"? This is a very restrictive methodology indeed. And it certainly runs the risk of blinding the historian to the emergence of creative theoretical hunches and insights that his historical subjects might have wanted to describe in the more enlightening terms now familiar to us, if only they had been able to wrestle such concepts from the unadapted conceptual environments available to them in their own time. Here it would seem the historian is justified in exploiting the advantage of hindsight. Thus a less restrictive historiography may have the potential of being the more enlightening and unravelling, yet stand in danger of the opposite risk of writing no more than mere Whig history.

Sutton is acutely aware of this risk and bravely confronts it. Thus when Anne Harrington notes that "the historian must make every human effort to discipline his or her culturally coloured subjectivity and take the historical

evidence on its own terms" (Harrington 1987, p. 5), Sutton decides to "refuse this sensible historian's caution, and [to] flirt throughout with the twin dangers of nostalgia and present-centredness" (p. 15). Indeed, in a slightly different yet analogous context he goes so far as defending a deliberately partial reading (p. 57), as when he decides to bypass Descartes' separate 'intellectual memory' (which philosophers have traditionally focused on to the exclusion of Descartes' disconcerting neurophilosophical ruminations) and to concentrate instead on Descartes' theory of corporeal memory. Here again, rather than just letting the historical subject 'speak for himself' by taking the whole undiluted text as the historian's assigned object of inquiry, Sutton prefers what anthropologists would call the third-person or 'etic' stance over the first-person or 'emic' one. The former methodology would encourage adopting a hermeneutic style in which a corpus of texts might legitimately be interpreted in terms that are foreign to its own conceptual environment. In contrast, an emic stance would allow no more than faithfully bringing to life the ideas of the historical subject in terms as close to the subject's familiar intellectual vernacular as possible. I think Sutton's etic methodology yields a fruitful perspective. However, rather than deciding the underlying methodological issues *a priori* and on principle, one had better discuss such matters on a case-to-case basis in terms of the historiographical harvest actually obtained, or in terms of the validity, the plausibility, and the novelty of the resulting historiographical insights.

Naturalism

Sutton's one-sided emphasis on Descartes' theory of corporeal memory, as well as his general resolve to read pertinent Cartesian texts from an overall connectionist perspective, are two cases in point which would seem to require an etic methodological stance in historiography for their justification. Now these two points may seem to Sutton to shade into a third one, which I hold to be distinct. It concerns the question whether or not we are entitled to adopt a *naturalist* stance in our interpretations of the Cartesian corpus, as Sutton advocates (in good company). Of course, if one takes for granted the traditional philosopher's interpretation of Descartes according to which rationalist anti-naturalism is already part and parcel of Cartesian philosophy, then a naturalistic approach towards Descartes' philosophy could be justified only on etic methodological grounds. As I have amply argued elsewhere (Meyering, 1989), there are good grounds for rejecting the premise of this argument. For anti-naturalism is not only (a corollary of) an untenable dogma of analytic

philosophy (see, for instance, "Two Dogmas of Empiricism" in Quine 1953), it also constitutes a seriously distorting perspective if applied to the historiography of philosophy. So on this point I am in wholehearted agreement with Sutton when he criticises anti-naturalist history that "either neglected Descartes' science or treated it only as an adjunct to first philosophy" (p. 51). Similarly, Sutton is completely right when he seeks "to counteract historiographical obsession with metaphysics" (p. 51). The only, minor, point I would wish to make, then, is that I wouldn't call *this* a question of '*retrospective* reading' (p. 51, italics mine), but rather a question of the correct approach towards the history of philosophy in general, and certainly towards Cartesian philosophy in particular. In brief, this is not a question of (etic or emic) methodology. Rather it is a question of historical content.

Coherence

Notwithstanding my positive assessment of the legitimacy of Sutton's approach in general, his skewed historical slant on the topic of Descartes' theory of memory and his tendency to portray Descartes as a latter-day neurophilosopher faces, as one may well expect, virtually insurmountable difficulties. For how are we to reconcile the Descartes of the *Meditations* with Descartes the neurophilosopher and the psychophysiologist of *L'homme* as seen through Sutton's eyes? Are we to relegate what are traditionally taught to be crucial tenets of Cartesian philosophy—Descartes' metaphysical dualism, his seemingly professed rationalism, his expositions on intellectual memory, his view of body as purely extended and thus as utterly inert, *etc.*—that perennial subterfuge of the rational reconstructor's embarrassment, namely ideological *mauvaise foi* or dissimulation on Descartes' part? It is not that Sutton's interpretation of Descartes' scientific work is simply falsified by such contrary observations. It is just that Sutton surely owes us an account of how the various seemingly incongruent pieces of Descartes' intellectual legacy fit together into a coherent whole.

Indeed Sutton's reading of Descartes yields a fascinating mirror image of the received view. Formerly we had a univocal rationalist philosopher Descartes whose *message* was that of metaphysical dualism. Now we are presented with an equivocal or 'dualist' *Descartes*, the crypto-neurophilosopher, whose true message is distributed processing in the brain! Yet Sutton's mirror image stands in danger of making the mistake opposite to that made by traditional interpreters, namely that of now treating Descartes' *metaphysics* as a mere adjunct to his scientific theorising! Are we then to believe, perhaps, that Cartesian metaphysics was designed merely

to please the theological Faculty of the Sorbonne and that it should not be regarded as deeply relevant to a reliable picture of Descartes' true philosophical significance? That would certainly burden our credulity. Fortunately, that isn't Sutton's answer, to be sure. But for all the illuminating answers Sutton does give (pp. 67–99)—and highly illuminating and intriguing these answers certainly are—the final upshot of his response is an admission of a fantastic incoherence, a "key historical crux in Descartes" (p. 101), a "terrible internal pressure" in his theory (p. 101), a "recurring desire [on Descartes' part] to distance himself from his own theories of physical-cognitive processes like remembering" (p. 101). On Sutton's account it is Descartes' longing for the notion that somebody or something is in charge, capable of asserting control over the wayward body, that forces him to postulate "the fragile authority of a central executive, whether the incorporeal intellectual memory or the rolling pineal gland" (p. 100). In other words, Descartes' insuppressible need for inner discipline, for a rational agent and for a locus of global control makes him piously mention the importance of intellectual memory and succumb to the posit of a central executive, incompatible with the distributed model of memory, with the autonomous "folding, sieving, and commotion of the physiological fluids and fibres" (p. 100), and with the "winds and flames of the animal spirits" (p. 101).

However, one may well wonder whether this is sufficient explanation for the mighty metaphysical edifice Descartes erects in the *Meditations* and elsewhere! Is a philosophical monument of such immense and self-assured proportions called for, and thus possibly explained, simply by a certain lingering unease on Descartes' part over a possible lack of executive control and inner discipline? It is hard to believe how such an exuberant celebration of the rational soul as orchestrated in Descartes' metaphysical writings, with virtually every statement in the ostensibly deductive development of Descartes' argument in explicit contradiction with what the crypto-neurophilosopher Descartes would really have us believe about the inner workings of the mind/brain, could have been instigated with such seemingly unshakeable confidence and in such elaborate detail if the motive for it was apparently so slight while the felt sense of doctrinal incoherence must have been so acute and agonising—especially in a thinker of Descartes' measure of rigour and clarity!

Executive Control

Apart from these larger issues Sutton's interpretation also raises more detailed questions as to the *relationship* between the kinds of control exer-

cised by the rational soul and the pineal gland respectively. To be sure, Sutton has very interesting things to say about self-mastery (pp. 99–102) and about control by the rational soul (pp. 80–81). But how exactly does this kind of executive control relate to the quite different 'control' exercised by the pineal gland? Though the latter kind of 'physical-cognitive' control is the more interesting from the modern point of view, it is not clear how it could contribute much to bridging the gap between body and mind, or between physical and rational cogitation—assuming, that is, rather unconventionally, that that was what Descartes was after in the first place! Sutton's intriguing suggestion (pp. 76) that Descartes in fact interposes 'complex automatism' between simple automatism on the one hand and true action on the other doesn't seem to be very effective in alleviating the tensions generated by his special neurophilosophical reading of Descartes.

Complex automatism, on this view, would constitute a hybrid source of intermediary control over, possibly, long temporal gaps, yet would involve no more than the pineal gland without any control on the part of the rational soul being required. Yet it would seem that it is a little misleading to speak of control here. At any rate, the genuine control exercised by the rational soul seems to be quite opposed to the 'control' exercised by the pineal gland. For the former consists to a large extent in trying to *unlearn* some of the associative links set up by the automated conditioned responses in the pineal gland. So I am not at all sure it is correct for Sutton to say that Descartes, rather than conceptually isolating the patterns of conditioned responses emerging in the rolling motions of the pineal gland, in fact couples them with rational control and self-mastery and considers them equivalent (p. 80).

Continuity Claims and Reference Potential

In conclusion, let me touch upon a more general question in the history and philosophy of science. The connectionist framework Sutton invites us to map onto Descartes' neurophilosophical theorising surely provides a highly suggestive model for his theory of how the animal spirits may operate in the brain so as to sustain corporeal memory and distributed representations in superpositional 'storage' over long periods of time. But how far does the analogy really go and what levels of detail should be required to map onto each other in order for the suggestion to be plausible or real? It is not as if Sutton's account is evading such queries. On the contrary, he puts his cards on the table and the helpful diagram he provides us with (p. 156) has the very merit of inviting our scrutiny. Yet the items most conspicuously missing from the range of the various

mappings suggested in the diagram precisely concern such crucial features of the connectionist architecture of the brain as the activation values of the processing units and the related mechanism for plasticity. Sutton's vague suggestion of 'microstructure' as an analogue for connection weights doesn't seem to amount to much more than empty hand waving. As is well known, in neural networks these features are implemented by spiking frequencies and connection weights. Now, surely, it would be completely unfair to evaluate Sutton's interpretation by requiring that Descartes' brain model include even an inkling of the biochemical mechanisms only twentieth-century brain research has finally managed to reveal to us. Yet it would seem that Descartes' model should at least provide corresponding mechanisms, characterised at some more abstract functional level of description, mapping onto these key elements of connectionist theory. Lacking such mappings the proposed analogy doesn't seem to be sufficiently 'anchored' in crucial details of intellectual reality.

This issue nicely ties up with a broader philosophical question concerning theoretical continuities and discontinuities in general. In a chapter entitled "The Puzzle of Elimination' Sutton discusses the question why animal-spirits theory was abandoned in the course of the eighteenth century while that theory was not an impediment to neuroscientific progress (and never had been). Some authors have suggested animal spirits simply had to be eliminated in the same way that witchcraft or *locus naturalis* had to go. By contrast, other historians have stressed animal spirits' continuity with later research by Galvani *et al.* on animal electricity, claiming that animal spirits were simply *reduced to*, in the sense of being *identified with*, neural electrical fluids. Indeed, as Sutton observes (p. 217), it was Galvani's own view that his research actually *explained* the nature of the animal spirits.

Now notoriously, debates surrounding conceptual change have raged during the past three decades or so between philosophers of a relativist versus those of a realist bent, each party invoking correlative semantic theories in support of their claims. Now that the dust has settled somewhat, more pragmatic views seem to have emerged. Thus Kitcher (1978 and 1993) has stressed the contextual nature of reference. According to this view, terms have associated with them a *heterogeneous reference potential*, so that reference is fixed differently in different contexts. This opens up a more dynamic picture of reference fixation than the classical options would allow. Instead of the 'totalitarian' or 'inflexible' views (Fine, 1975: 26) implicit in causal-historical and descriptive theories of reference alike, this more sophisticated dynamic view of reference would render claims of theoretical (dis)continuity a matter of contextual and historiographical relevance and evaluation. Consequently, in my view, the scope of such claims would in principle be widened considerably, depending on what

characteristics associated with a term one would wish to select as essential for the purposes of historical explanation, as well as the level of abstraction one would wish to highlight for the historiographical task at hand. To be sure, the coarser the grain of analysis or the more general the set of associated characteristics, the looser the correlative claims of continuity or discontinuity, of reduction versus elimination. Even so, such claims could still yield crucial insights in the dynamics of intellectual history to which the less flexible classical theories of reference would be blind.

I am not sure to what extent Sutton implicitly concurs with this line of reasoning. One indication that he does is found when he proceeds to take into account wider spirituous domains (such as culturally permeated 'descriptions' of the cognitive phenomena, or the eighteenth-century emergence of *homo psychologicus* and of the Enlightenment ideal of 'moral Man') within the context of his discussion of reduction vs. elimination of animal spirits during the eighteenth century (pp. 218). Needless to say, I applaud this move, and believe it to be legitimate. Indeed, Sutton takes a cue from Edwin Clarke (Clarke 1968, 139–41), who ascribes the twentieth century reintroduction of dynamic conceptions to its tie with the seventeenth century and with the Baroque demand for movement (quoted on p. 218). Similarly the neurobiologist Jean-Pierre Changeux chose 'Animal Spirits' as the title for the chapter of *Neuronal Man* which seeks to replace 'a static description' of cerebral wiring with knowledge of a different, dynamic order (Changeux 1985, quoted on p. 218).

Now I submit that all this pertains in a profound sense to an evaluation of the main thesis of Sutton's book. For, if anything, Sutton's account of Descartes' theory of memory itself involves an exciting continuity claim, albeit one of a very general and abstract nature. As I understand it, the point of Sutton's book is not just to draw attention to a striking structural analogy he discerns between Descartes' neurophilosophy on the one hand and modern views of memory and of distributed representation on the other. It also emphatically implies the *historical* thesis that "there is a longer background to more dynamic views of memory than is commonly acknowledged" (p. 15). To evaluate that thesis, then, becomes, in view of what I have just said about an expanded theory of reference potential, a delicate question not just of weighing the historical evidence, but rather of deciding whether certain abstract but highly general, and thus possibly superficial, structural similarities between the two brain-processing models under consideration outweigh the striking absence in Descartes' theory of memory of convincing analogues to such key elements in the connectionist story of parallel distributed processing as activation values and connection weights. That decision Sutton's otherwise fascinating historical account has, I'm afraid, left insufficiently motivated and compelling,

notwithstanding its highly original insights and its numerous thought-provoking *aperçus*.

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Author's Response

By John Sutton

Historical Cognitive Science

I am lucky to strike three reviewers who extract so clearly my book's spirit as well as its substance. They all accept and act on my central methodological assumption: that detailed historical research, and consideration of difficult contemporary questions about cognition and culture can be mutually illuminating. It's gratifying to find many themes which recur in different contexts throughout *Philosophy and Memory Traces* so well articulated by my reviewers. They catch my desires to interweave discussion of cognitive theories of memory with moral questions of psychological control and self-mastery, to evoke the virtues and the pleasures of strange, baroque beliefs about fickle 'animal-spirits' coursing through the nerves and the brain, to demonstrate that mechanistic explanation (even in its blunt old Cartesian form) can acknowledge complexity, and to develop scientific conceptions of dynamic memory traces and representations which can survive uncharitable philosophical criticism. The book's insistent interdisciplinarity is just an inchoate quest to acknowledge the daunting variety of the phenomena: remembering is both natural and cultural, and is studied by narrative theorists as well as neurobiologists, by physicists as well as psychologists. By fusing the detail of a history of early modern neurophysiology with the committed, even gullible fervour of a defence of 'new connectionist' cognitive science, I wanted to pull out the carpet from all those who are happy to let 'scientific' and 'cultural' approaches to the mind run along independently. Once this general project is given space, as it is by all three reviewers, we can get down to specifics.