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BODY, MIND, AND ORDER: LOCAL MEMORY AND THE CONTROL OF MENTAL REPRESENTATIONS IN MEDIEVAL AND RENAISSANCE SCIENCES OF SELF

1. NEITHER WORD NOR IMAGE: CONFUSION AND COGNITION IN HISTORY

Historical cognitive science works between two projects. One is the analysis of other and older theories of mind, of how they relate to and differ from current approaches, and of what forgotten or neglected explananda they bring into focus. The other, relating to cognitive practices rather than theories, is the task of working out how such views about mind and self reflect or partly cause different historical forms of mental activity. The delicate equilibrium to be maintained is between allowing for the plasticity in human cognition which anthropological and historical data can suggest, and yet remaining not just aware of but embedded in the diversity of approaches in contemporary theories of mind, in order to make the history effective and utilisable in the growing interdisciplinary environment. In specific domains, such as visual perception, dreams, emotion, inductive reasoning, or (as here) memory and learning, the shifting interdependencies of cognition and culture can be traced from two directions. Firstly, tensions can be addressed in many periods between social or moral norms and theoretical commitments concerning body, brain, and mind; then, more self-consciously present-centred inquiry can employ polemically, within cognitive science, the extra breadth, context-sensitivity, and attention to discontinuity which historical work requires.

This paper, then, is a tentative step, at a very general level, towards the proposal of one set of analytical devices for historical cognitive science. The domain is an area of problems about memory and personal identity which cross levels between philosophy of mind, 'psychology', neurophysiology and medicine. The case, crudely, is that embroiled with these problems have often been a series of related conceptual dichotomies or, better, continua between

order and confusion, independence and blending, distinctness and dissolution. Attitudes towards these constructions, having real enough effects in particular contexts, colour theoretical debates about self, memory, and brain not only at levels which are obviously metaphorical and rhetorical.

Visual, graphic, and textual supplements to human cognition changed form rapidly in the 'proto-scientific revolution', and in turn altered needs for and capacities of visualising and imagining. Martin Kemp and Jim Franklin in this volume confirm the complexity of relations in the period between the external media of pictorial and linguistic representation, and the cognitive styles of learning and reasoning which evolved with new modes of illustration and instrumentation. Kemp warns against the temptation to seek a single general theory of the parallels between mental representation or information-processing and external technology-dependent representation across different domains for this or any period. But still open are a set of strategies which I apply here to familiar enough material on the case of remembering, rather than visualising or imagining.

As Kemp notes, in any one period common aesthetic and rhetorical metaphors may be found in sciences which otherwise call diverse models into play. He cites repeated invocations of cosmic symmetry designed by the orderly divine artisan, a symmetry impossible to disturb in any part 'without producing confusion in all the other parts':[1] theoretical visualisation of astronomical and anatomical bodies was less bound by the limitations or peculiarities of existing instruments or illustrations than by metaphors and analogies embedded in the Renaissance aesthetics and ethics of decorum.[2] In the case of the branch of natural philosophy dealing in mental models of memory and mind (rather than of planets or body parts), the constraints of various social or moral conceptions of order and decorum permeated theory construction even more thoroughly.

Despite Renaissance rhetoric of cognitive order, and the hatred of 'evil mixture' with its anarchic psychological and social consequences, a contrasting and conflicting attraction to confusions and dissolutions also had its powers. In social, metaphysical, cognitive, and physiological domains, the perils and beauties of mixtures induced both fear and fascination. This is old news, at least within sixteenth and seventeenth century social, political, and literary histories: order/chaos dualisms structure influential accounts of 'Renaissance thought'.[3] Renewed attention to breakdowns of such dichotomies is a feature of recent interdisciplinary history.[4] But their implications and complications have been

less studied in relation to memory and self. I want to bring to bear two lines of thought, familiar in other contexts, which seek to bridge gaps between minds and cultures. First is the treatment of theoretical models of memory as specimens of the way cultural norms and artefacts can permeate ('proto')scientific views of inner processes. Second is the application of this analysis to the particular area of psychological control over one's own body, brain, and mind.

Metaphors and models for memory and mental representation can signal the projection inside of external aids. Overtly at least, medieval and Renaissance theorists agreed that such models had to allow for, or even guarantee, some conception of cognitive order and discipline. In the case of memory, this entailed both that individual representations or traces should be independent or isolable, not mixed up or interfering with others, and that some sense be given to the experience of and desire for active control over remembering and associative mental processes. In section 2 I address these requirements as they appear in the various forms of the arts and techniques of place memory. Moral psychologies of memory were always linked to, and could come into tension with, alternative philosophical or physiological approaches which couldn't ensure in advance the subject's control over distinct items in memory.

This leads to the second point of departure. In a wonderful essay on Donne, Elaine Scarry has argued that Renaissance theory of the human body, the animation and entering of the body by science, religion, poetry, and language in general, is often an 'interiorisation of the artefactual', driven by a desire to revise the body in order to render it susceptible to voluntary control.[5] I apply this suggestion to the longer tradition of improving or bypassing 'natural memory' by deliberately internalising artefactual models. In the arduous processes of 'self-fashioning', boundaries between inner and outer, between bodily or psychological contents and cultural or technological items, could be shifted.[6] Coexisting inside theories and individuals were often two conflicting attitudes. On the one hand, fear, disgust, and loathing of the confusions attendant on physical and cognitive mixture could fuel concerns to find guarantees of immunity from melding, inducing theoretical rage for order. On the other hand, seductions of and fascination with blending and fusing, desires to dissolve dully independent mental items or selves into new combinations, could keep up residual dissatisfactions with over-rigid impositions of order.

This, anyway, is the broad framework, the schema behind this over-general analysis.

There is a final, more present-centred, motivation for examining these topics. Modern cognitive scientists have tended to think of pictorial and linguistic media as opposing and mutually exclusive candidates for being the medium of mental representation.[7] But in the recent resurgence of 'new connectionist' approaches to memory and mind (in the form of parallel distributed processing models and neural networks),[8] the suggestion has arisen that there might be a fundamentally different form of representation, neither pictorial nor linguistic, neither word nor image.[9] A brief digression on this possibility may illuminate the later analysis.

The key to such 'distributed representations' is the idea of 'superpositional storage'. Representations or traces are not kept passively in separate boxes or at distinct addresses, waiting in cold storage for an active executive to pull them out for processing. Instead, many traces are overlaid on or in the same physical (sub)system, not as distinct explicit items, but as dispositions for the reconstruction of patterns of activation across the system. Any one trace is 'stored' across many parts of the network, and any one part of the network is involved in the 'storage' and reconstruction of many traces. Since only one explicit pattern can be active in a network at one time, an activity pattern not explicitly present does not, in one sense, exist anywhere: it is only there, along with all the other implicit representations, as a disposition for the re-evocation of that explicit pattern.[10]

Distributed representation is interesting not only as the fad causing current turmoil in cognitive science. It provides direct connections with the analyses of metaphors of order and confusion. As a direct consequence of superpositional storage, distributed representations, overlapping in implicit representational space, tend to interfere one with another, to blend and mix, all of them affecting all ongoing processing and being in turn affected by the changing state of the system as new traces are laid down and old ones altered or activated. In the contemporary context, optimists take such patterns of interference to promise provocative modelling of phenomena of generalisation, blending effects, and prototype extraction in human learning and memory.[11] Critics argue that realistically-scaled networks will be unable to distinguish (reproduce) any of the superposed representations, to achieve even the degree of order in remembering which humans do, but will suffer catastrophic interference **as** overlaid patterns

are obliterated and forgotten.[12] These debates, then, are in part about the explananda, about what is most characteristic of the way human memory works, and so deal inevitably in rhetoric and assumptions about order and confusion as well as in the technical details of the particular models available. Linking them with parallel historical debates is one way to broaden the scope of current discussions to include attention to the issues of cognitive architecture, mental control, and subjectivity which are already implicated in the more technical controversies.

If there is anything in the possibility that distributed representations are indeed different from both logico-linguistic and pictorial-imagistic forms of representation, then there should be hints of this alternative in the disagreements and unresolved tensions of other models of memory. I have argued elsewhere that this is the case for seventeenth and eighteenth century theories of memory, mental representation, and personal identity.[13] Here I seek to do the same for earlier periods, using medieval and Renaissance scholars' research on memory arts, models of memory which clearly do not explicitly sanction distributed representation. The modern debates can play no further direct part in this paper, but the need to trace these implications and issues underneath debates over memory and cognition applies no less firmly to our own sciences.

The last set of connections, in section 4, expands beyond memory again to hint at simultaneous theoretical movements or pressures away from and towards confusion across other domains in which issues of blending and distinctness arise. Developing this approach more fully would allow the exploitation of memory's boundary-blurring connections, across physiology and medicine, providing the matter which both dreams and reason trawl, and reaching up to play central roles in attitudes towards problems of personal identity and psychological conflict, and, further, towards the bridge between individual psychology and social relations. This section is necessarily even more sketchy than the rest, but at least gestures towards the range of historical issues about cognition and culture which memory and its attendant confusions can open up.

2. LOCAL MEMORY AND COGNITIVE DISCIPLINE

In the sprawling traditions of place memory, imagistic and textual models for internal storage functioned in complementary rather than opposed fashions,

united in that both fulfilled theorists' desires for order in memory. Both mental models of mental representation were uneasily tied to medical traditions: the need to discover or impose inner discipline on the memory is all the more urgent if roving, nimble animal spirits are the fickle medium of mental control.[14] But the venerable physiological spirits were less pivotal in Renaissance neurophilosophy than they would become in the seventeenth century.[15] Here, then, rather than addressing the physiology of memory directly, I tour backwards through norms of local memory, recalling the complexity of the metaphorical associations of the memory art which Renaissance natural philosophers knew well. As Kemp suggests, references by leading scientists to the importance of external aids for strengthening the memory are 'unlikely to have been casual'.[16] The moral and normative constraints on theories and practices of remembering which are obvious in these contexts do not disappear from later or proto-scientific models.

The following sparse analyses of conceptual foundations of ancient, medieval, and Renaissance arts of memory rely almost entirely on the exciting and complicated materials provided by Frances Yates and Mary Carruthers.[17] These historians have teased out the details of readings, misreadings, and applications of Aristotelian associationism, faculty neuropsychology, the rules for places and rules for images found in 'Tully's' *Ad Herennium,* complicated by Cicero and Quintilian and filtered through the Arabs, the medieval ethics of memory, and Renaissance occultism and Neoplatonism. But for the history of theories of mental representation, it is useful to extract influential ideas from this complex of traditions. Such a survey will not cleanly assign all of its results to the particular, often distinct elements of the conglomerate of memory practices and theories which self-conscious moderns would soon find intensely alien. But it can seek to push on the historicising of a naturalistic cognitive science by examining shifts in, motivations for, and attractions of belief in what the historians tend to see only as 'certain enduring requirements of human recollection'.[18]

2.1 Localist Models: the Independence of Stored Items

Ideas encoded as images or notae in or on the various places of the memory systems must be independent of each other, and must map individually onto the places. John Willis advises the lacing of every idea in order 'always provided,

there be but one idea assigned to one place'.[19] This is why strict division of material is a precondition for successful encoding: the items must be isolated, kept distinct one from another.[20] Division guarantees that memory will be, in John of Salisbury's words, 'a sure and reliable place of safe-deposit for perceptions'.[21] Because each idea is in principle independent of all others, yet stands in a fixed, ordered relation to them, it is possible, in executing a search procedure, arbitrarily to access any item, proceeding in any direction, skipping some material or moving around at random.[22] In this lasting local model, then, no two ideas can be in the same place: they must be 'actually different and separate one from another'.[23] It is this isolating of ideas at the time of encoding which wards off error in remembering: as Carruthers argues, ancient and medieval memory theorists considered mistakes as due not to distortions at the time of recollection, but to failures to make images 'sufficiently distinct from one another' in the first place.[24] Each memory address in the place system is loaded with only one item, and the system's capacity must not be overloaded by the number of items stored.[25]

Further support for this principle of the independence and isolation of memory items one from another was garnered from the medical traditions of faculty neurophysiology. Memory as an entire faculty was distinct from the other internal senses (perception, phantasy, common sense, and sometimes reason), and this distinctness was grounded in the localisation of memory in the posterior ventricle.[26] Now a view that memory capacities are, in general, localised in certain parts of the brain does not entail a localist view of the storage of *particular* memories: memory could, globally speaking, be localised, while memories, within the local areas, are still distributed.[27] But there was an easy slippage to the notion that individual memories in turn must be located separately, 'placid bi rewe along in ye heed, and ech in his propre celle'.[28]

2.2 Rigid Order and Memory as Inner Writing

The second general feature of the local art of memory, repeatedly invoked, is that 'order most secures the memory'.[29] Items are rigidly fixed in the soul by the use of mental grids, alphabetical systems, lists, plans and so on, on which they could be independently placed.[30] Fixed ordering of items in memory is possible just because of a prior ordering of reusable memory places.[31] It is up

to the prudent soul trained in the art of memory to extract, manipulate, and combine (by juxtaposition rather than fusion) the items stored.

These features of independence (of images or items) and order (of places or addresses), as Carruthers recognises, make medieval memory systems exemplars of random access memories. Mental bins or cells remain unchanged as an executive system[32] arbitrarily manipulates, extracts, or replaces independent items arbitrarily stored therein.[33] Renaissance and baroque memory places could be vast and convoluted theatres, wheels, and layered circles: but the point of all such inner edifices was to ensure the total separation of more and more distinct loci within.

A more specific model which preserved these features often enhanced the practitioners' faith in the power of their trained memories to ward off fears of loss or obliteration. The writing of memories into areas as if on wax is a mechanism for fixity, so that contents are held more firmly.[34] Theorists thought of the medium of mental representation as both pictorial and linguistic: to use David Krell's felicitous labels for the classes of memory metaphor, the *typographic* imprinting of contents as on a wax block slid easily into the *iconographic* copying of originals into memory images, which in turn slipped into the *engrammatological* inscription of contents in a language of thought.[35] The textual model for mental representation seemed to ensure the required semantic stability of local items, which retained their content across different contexts, even when moved around the place system or the book of memory.[36]

These metaphors provide metaphysical points of entry for a homuncular soul, separate from the distinct imprints, pictures, or writings which it can somehow interpret, decode, or read. Such a central executive is a moral as well as a psychological necessity, since the idea of order in memory is linked with the requirement that discipline be imposed on one's memories. Rigid order is in some contexts a theoretical discovery about the nature of memory and elsewhere an imposition on memory, to be maintained on pain of falling into confusion.

Pictorial and linguistic representations were not mutually exclusive candidates for mental representation. Both clear and distinct images and inner writing will ward off confusion. Discipline is aided and exemplified in treating the brain as a 'book and volume' in which clear current contents can, in principle, wipe away trivial observation or unwanted 'pressures past'.[37] The normative requirement is clear in such a system: only the resolute, disciplined,

prudent, trained soul will be able thus to obliterate the improper and retain in unmixed independent form the morally appropriate contents alone.

Although, as Carruthers convincingly argues, the arts of memory and the associated cognitive practices were not simply displaced by written records, the need to supplement memory by (external) writing, a need which the figure of memory as writing would in theory render unnecessary, did become more prominent. The art of memory is useful, John Willis remarks, only when you can't get contents down on paper, downloading memories into external words, 'the most happy keepers of any thing in memorie'.[38] In an odd chapter, Willis even includes in his art the use of (not just a linguistic representation but) the object as its own memorial symbol: placing a book by the door as a reminder is a surer guarantee that we will remember to take it than imaging or inscribing it on a memory place.[39] Hamlet has to write the ghost's commandment on external 'tables' as well as on the table of his memory.[40]

In other traditions of moral memory the downloading of inner script into an external medium met a stronger ethical demand. Janet Coleman's account of the 'blanched' memory of Cistercian tradition shows that Neoplatonist needs for the past to be purified were met by purging 'filthy traces' through the scriptural word.[41] We are again in the domain of mental control as technology of the self: the moral life is the disciplining, ideally the obliterating, of potentially corrupting inner items.

2.3 Will, Discipline, and the Moral Control of Memory

The possibility of such discipline over one's own representations requires curious division, the separation of a self from its memories. Ideals of powerful executive control sat well with local memory, for independent ordered items in their places were already passive, waiting for the active executive to hunt them out. Reminiscence or recollection was ethically prior to recognition and associative memory.[42] Similar models of control occur in the well-documented field of political metaphors for cognition. In Kenelm Digby's mid-seventeenth century localist model, the cognitive agent (the will, brain, or fancy) can light on, pull out, and move around passive atomic items: when it has trouble in recollecting something,

... it shaketh again the liquid medium they all floate in, and rooseth every species lurking in remotest corners, and runneth over the whole beaderoule of them; and continueth this inquisition and motion, till eyther it be satisfyed with retriving at length what it required, or that it be grown weary with tossing about the multitude of litle inhabitants in its numerous empire, and so giveth over the search, unwillingly and displeasedly.[43]

Not only does this cognitive agent, prone to boredom and petulance, have the power to scan and search through its liquid empire: it also recognises when it has retrieved the required memory. Wholly distinct from the stored items in its dark cells, the processor of local memories itself needs remarkable capacities for recollection:[44] a set of tasks and techniques must thus follow to enhance its chances of success.

Morality must be branded in the memory. In guaranteeing that one's traces are 'lofty'[45] rather than filthy, in ensuring that the prudent soul can order the confusion of the body and the traces it conceals, students of local memory could find solace in the regimen suggested by their psychophysiological theories. Differing views of the relation between natural and artificial memory all left room for learned improvement. Easily, though not always, assimilated to the distinction between corporeal and spiritual or intellectual memory, this natural/artificial distinction rendered problematic any attempt to specify what memory was 'really' like. 'Natural' memory as conceptualised in any theory was itself already cultural, shaped as a lack or incapacity to be remedied by particular artifices.

Artificial memory, in various systems, could be characterised simply as the imposition of discipline on natural memory.[46] The independence of stored items and the rigid order of places had always to be struggled for, through conscious cultivation and practice. Memory techniques were cognitive tools which, in different periods and traditions, were intended to complement, improve, strengthen, or supplant and bypass entirely the natural memory.[47] While some saw natural human capacities as merely needing some honing, others took natural memory to be irretrievably weak, arguing for example that artificial divisions are required between sets of connected material because 'the memory is lazy and rejoices in brevity'.[48]

The historians of memory have theorised this artificial/natural distinction variously. Carruthers sees it as confirmation of the modern cognitive

psychological finding that (natural) short-term memory is limited to around seven independent items, so that memory techniques are ways of compressing more information into a single such local image.[49] Yates, with a wider historical extension into Renaissance arts, argued that increasing trust in the potential of human memory showed a pattern, typical of the 'Renaissance psyche', of new confidence in human capacities to express the divine and grasp the intelligible world.[50] Here I want to probe what it reveals about the local memory theorists' concerns, rather than their confidence, about the sources and degrees of cognitive order and control.

The medieval arts took as their domain the sadly imperfect capacities of human memory after the fall. Artifice is needed because of corruption and bodily confusion of memory from its prelapsarian state.[51] It is as a concession to the fallen soul, entranced by corporeality and particularity, that images are used.[52] But for sin, humans like angels would have no need of memory.[53] After Eden order must be fought for. With the fragility of natural memory apparent, space is carved out for the imposition of a range of techniques on the self and its murky contents. Even if Hermetic and Neoplatonist strands of Renaissance thought did, as Yates argues, hint at a more positive view of the potential strength of controlled recollection, this still required long immersion in occult arts as intricate as Bruno's.[54] The darker vision persisted in many religious contexts.

The weaknesses attributed to natural memory derived from its physical sources and mechanisms. In any individual it depended on elemental constitution, astrological endowment, and physiological fortunes. The irretrievably bodily character of natural memory was one source of difficulty for moral memory. Confusion was taken to be natural to 'natural' memory: one way of thinking of the artificial techniques was as a creation or substitution of an external memory, albeit one internalised as places and images, for the initially weak internal one.[55]

Defenders and critics of the different arts of memory alike made claims to order and unity. Theorists in both Aristotelian and Neoplatonic strands of the place techniques stressed the capacity of their art to unify the chaos of particulars which would otherwise swamp and overload the memory. Whether aiming at oneness with the One,[56] or merely enhanced abilities in perceiving and extracting forms and prototypes across their particular instantiations,[57] rhetorical

or propagandist statements promised some kind of cognitive order to overcome or exclude associative excess and undesirable mixture.

2.4 Against Confusion and Multiplicity

Joseph Glanvill criticised the theory that memories were distributed motions or shifting patterns of animal spirits. If this were true, any chance mental process occurring as we tried to remember something would 'put all the other Images into a disorderly floating, and so raise a little Chaos of confusion, where Nature requires the exactest order'.[58] After Descartes, the need to combat distributed animal spirits models of corporeal memory was pronounced.[59] In attacking them, Glanvill reveals the ease with which the order previously imposed on natural memory by artifice could, as the arts of memory declined, be projected inside to become the explanandum for any psychology of memory. Yet there is a slippage still between the *assumption* that memory is 'capable of regularity' by nature (a 'uniformity' which all theories would then have descriptively to guarantee), and the *wish* that memories '*should* so orderly keep their Cells without any alteration of their site or posture'[60] when properly controlled (when a theory of memory would be normative, prescribing how we can avoid ataxy and impose order to retune the mental disharmony left us after the Fall).[61]

Medieval and Renaissance writers were less urgently concerned to deny or ward off interference. But they did seek recipes for maintaining the independence of stored items and the rigid order of places. Without a trained and prudent memory, local memory theorists warned, we would be lost in the murky forests of memory, wandering amidst 'a mass of unrelated and disordered material'.[62] The arts of memory exist to help us avoid confusion, though they may only succeed, as the *Ad Herennium* had warned, if confusion is already avoided in the initial establishment of independent places. In laying down images on images, those who fail to make proper divisions will proceed 'without order and in a confused form'.[63] Carruthers summarises the perceived dangers of not using a safe technique, of 'relying on simple chance to fish what one wants out from the murky pool of one's undifferentiated and disorganised memory': only rigorous discipline ensures the power or control to move around among one's own internally stored items without confusion.[64]

Analysis of particular kinds of confusion reveals both assumptions about and fears of possible forms of memory breakdown. Within a local model, the first

problem is of restricting the number of images to the number of places or addresses: otherwise memory will be crushed beneath a weight of images.[65] Seventeenth century localist theories had to contend with the problem of finding room in the brain for the whole variety of independent items remembered.[66] In the earlier period, the fear is more that overloading local places will break down the distinctness of the stored items, with the chaos of interference bound to result. Albertus Magnus described how 'confusion is engendered' when too many heaped up images 'break up in the soul and do not remain, just as a great number of waves break up in water'.[67] Carruthers comments that this concern is not that of the *Ad Herennium*, which advised only against the initial imprinting of crowded places. But there were ancient precedents for worry over how persisting ingredients in cognitive mixtures in an internal environment could retain their original identity and avoid being dispersed.[68] The danger is that the carefully constructed order of local items may break down, and interference ensue.[69]

One strategy against this was to seek the liberation of memory from the confusing body. Hamlet's wish to inscribe the ghost's commandment 'all alone' in the book of his memory 'unmix'd with baser matter',[70] links not only to a retreat from trivial contents but also to a desired decorporealising of memory, a shaking off of the dirt added to thoughts by the body.[71] In its more grandiose Neoplatonic forms the inner art was a discipline of slowly amending the corrupting embodiment caused by the Fall, drawing away from the 'punishments of matter'.[72] Even where moral memory was a moral physiology of balance, *hexis,* and proportion,[73] the fragile equilibrium of bodily *krasis,* proper blending, in the Aristotelian metaphysics of mixtures had to be keenly monitored.[74] The arts of memory were tied to humoral physiology, and advice abounded on the appropriate non-naturals required to retain sufficiently rigid order.[75]

The strength of the requirements of order and discipline in these various traditions, the constant keeping of confusion at bay, perhaps suggests the depth of the internal tensions in the models. As well as bodily intrusions into mnemonic order, local memory theories were complicated by the ancient method of using emotionally charged images to aid retrieval, images which if not treated prudently might induce exactly the indiscipline which was meant to be stamped out.[76] Images of violence, seduction, blood, mud, uses of zodiacs and bestiaries could leave the imagination dangerously free.[77] Reactions against

the dangers of indiscipline were most pronounced in the Ramist memory theorists who proposed, in contrast, imageless dialectical systems to intensify the principle of order.[78] Even though many did recognise the importance of powerful context-based and emotive associations, every participant in any debate about the arts of memory had to claim for their own system a route to true order, while banishing confusion to the opposition.[79]

Dichotomous fixations with order left no space for exploring the possibilities and complications of different forms of order. Ideas about the achievement of recollective order by the movement of images rather than by their static fixture seem not to have been developed.[80] While, as Carruthers' readings show, the entire powers of imagination were harnessed, through images of violence, dismemberment, and titillation, for moral or religious ends, they were seen only as auxiliary to quests for order. Bruno, following Lull, sought to introduce a dynamic element into the arts of memory, giving the images some activity as they are animated within.[81] But his more complex conceptions of order as folds, rather than simple chains or isolated rooms, was still subordinated to the dualistic task of passing beyond the convolutions to an angelical unity without disturbance, body, or multiplicity.[82]

3. MENTAL BRACHYGRAPHY

Both pictorial and linguistic mental representations, I have argued, are easily assimilated to localist models. Images and semantic items can have clear boundaries, which may be taken to map in simple isomorphism onto the equally clear boundaries of whatever it is they represent. On any general atomistic theory of representation, images or items have meaning in their own right, independent of their place in a general system of representations and their relations with other distinct representations within that system.[83] This picture is easily projected inside, onto a language of thought or a system of mental images in which single items have their semantic properties in isolation. Complex semantic items will then be generated by the combination or juxtaposition of arbitrary strings of these individual contents, preserving all original semantic information by preserving the exact syntactic form of individual representations.

In alternative, anti-atomist accounts, items are not initially entirely distinct, they have causal influence even when they are not explicitly 'there', and they combine not by juxtaposition but by blending, fusion, and interference.[84] Information, then, is inevitably lost, altered, added, or distorted: representations have to be (re)constructed, since, being stored only superpositionally, they do not endure independently to be simply reproduced. The compression and transformation involved between encoding and retrieval forces attention to the methods or mechanisms of 'decoding', which here means only (re)separation from the mix. An important change in recent connectionism is attention to non-linear processes in these transformations, which has also influenced recent theory on the order/confusion polarity inevitably called into rhetorical play here.[85] But there are hints too of relevantly similar notions of compression in historical theories of representation and memory.

In surveying the arts of local memory, I have pointed to lines of internal tension. Theorists were desperate to guarantee order, but were often aware both that order is not 'naturally' to be found, and that some of the best techniques for remembering, exploiting the noise and excess information carried in emotional images, intrinsically tend towards interference and confusion. The strongest historical inklings of distributed models would come in neurophilosophical and psychophysiological contexts. But even at the psychological level, it is possible to piece together, even from writers overtly hostile to interference, suggestions of a non-local form of mental representation which doesn't rely on the independent storage of distinct items.[86] I'll suggest this first with a seventeenth century example.

The problem with theories which take representations to be patterns of motions in the fleeting animal spirits, complains Henry More, is that they 'force a great deal of preposterous confusion' on the memory.[87] Retained representations, if left alone to be acted on by 'the bare laws of matter', would become 'strangely depraved, if not obliterated'.[88] More argues that only an immaterial soul can keep 'intire and unconfused images of things without'.[89] It takes something incorporeal, free of the 'foulness and coursness of *Matter*', to maintain many local items each 'yet distinctly represented'.[90] The brain does, however, have a subordinate role as the soul's instrument:

... she might make an occasional use of some private marks she impresses in the Brain; which haply may be nothing at all like the things it would *remember*, nor of any considerable magnitude nor proportion to them ...[91]

These marks, More reasons,

> ... must be a kind of *Brachygraphie*, some small dots here and there standing for the recovering to Memory a series of things that would fill, it may be, many sheets of paper to write them at large.[92]

With cognitive order here guaranteed by the spiritual 'inward Center', there need be no resemblance between physical traces and what they represent. Instead, there can be a compression of complex contents into condensed form. Similarly, Wittgenstein would argue against mental images by describing marks on paper which are necessary for someone to reproduce a passage of text, and yet which are not a rendering, translation, or simple storage of the text.[93] Both More and Wittgenstein take these suggestions to rule out any materialist account of memory.[94] But what is of interest here is their acknowledgment of the possibility of squashings or transformations of contents which improve on common external methods of transferring contents into other symbolisms. If mental brachygraphy can encode many different 'things' within a restricted physical system, each part of the system must be involved in the 'storage' of many items, items which are no longer independent. Though More is sure the soul controls her own condensed marks, he has allowed confusion to re-enter the scheme. There is nothing *within* the physical system to maintain or guarantee the identity of any of the ingredients in such a mix.

Some ancient arts of memory were projections inside of the Greek use of shorthand symbols, or *notae*, although the shorthand ideal of retaining a definite symbol for every single item in 'memory for words' was considered too cumbersome.[95] More useful was that aspect of 'memory for things' (for the gist) which compressed many items into a few images or metaphors.[96] Carruthers takes this process in its medieval form to be a simple substitution which condenses 'large amounts of material into single markers', with the resultant units still each independent local items.[97] But when focussing on the somatic side of the medieval models, she acknowledges within the Aristotelian associationist tradition a more dynamic kind of compression, in which the composition, construction, breaking and rejoining of condensed images,

processes uncertainly controlled by our cogitative and deliberative powers, could result in shifting, fracturing bodily traces of ambiguous identity.[98]

External systems for selecting and compressing bodies of material in brachygraphy and tachygraphy were theoretically comprehensible, since translation rules were constructed by humans and consensually accepted. It would be useful to examine relations between the development and theory of shorthand and stenography in the late Renaissance, and their possible roles as models for forms of mental representation.[99] Mental brachygraphy would be more mysterious, hieroglyphics and tracings in a more reckless algebra, in which the mapping of representations onto items represented could always be many/many rather than one/one. This might seem useful in later theories of memory, seeking to do without a soul which already knows the structure of the task domain:[100] but it would discomfort even anti-dualists who retain the wish for prior control over their own representations.

The need to bring passions, contexts, and diverse associations into play even within some local models shows the need for what we would call a content-addressable memory to supplement the hard-earned random access one. It was, perhaps, only the power of the metaphors and theoretical images of external order (rooms, cells, theatres, books) which kept up confidence in the internal preservation of single isolated items.[101] This rendered problematic the grounding of mental representation, brachygraphic or not, in unstable matter. But increasing attention to the possibility of incorporeal memory, which would culminate in Descartes' undeveloped and vain attempt to set an intellectual memory free from the confusion which his own physiology of memory allowed,[102] never overturned the dominant awareness among memory theorists of how much would be lost without body and brain.[103] In thinking of how remembering related to patterns of motions in internal environments, the wish to impose greater control and regularity on fluid innards contended with the acknowledgment that it was also interesting to construct internal mixtures from which might emerge unknown blends of altered ingredients.

4. BODY, MIND, AND MIXTURE

The remainder of the paper allows the body some space in these schemes, briefly exposing some of the innards. The movements of submission and

resistance to bodily confusion could, in some contexts, be simultaneous. Put another way, desire to retain autonomy and strict identity while mixed with matter could coexist with desire to be immersed in or merged with different corporeal blends. The approach to personal identity at work here is not the quest for criteria for unity and continuity of self,[104] but description of undersides, abnormalities, and excesses of the normative concept, pathologies of self which may throw light on what's missing from explicit philosophical theory.[105] The idea that there are attractions in loss of self as well as in the clear definition and separation (from matter, mortality, or society) of an autonomous self has become alien only to some modern philosophy of personal identity. But not only has it always featured in certain forms of mysticism, where the ecstasis of unravelling the soul can be a sought dissolution of dull identity rather than a discovery of the more perfect identity of the personal soul: it was a central issue in Renaissance philosophy of mind. In struggles over the Averroist doctrine of 'one mind', the will to lose memory and self in merging with the single immaterial soul was one draw to the idea of impersonal immortality as opposed to Thomistic personal survival.[106] In the early sixteenth century immortality controversies around Pomponazzi and his uses of Alexander of Aphrodisias, a key issue both in the interpretation of Aristotle and in the quest for truth was whether the intellect was 'unmixed' or was, as in certain medical traditions, simply the best-proportioned mixture of elements and qualities. If the latter, immortality seemed untenable, for all material mixtures will dissolve.[107]

Such naturalistic theories of mind threatened not only absolute immortality, but also the control of mental representations and bodily processes which, I have argued, local memory theorists sought. Without immaterial substance to order material mixtures from outside, the difficult task approached by philosophers like Pomponazzi and later Hobbes, as well as by medical theorists, was to construct a regimen for the immanent maintenance of psychological and bodily balance: there could be no single unified central executive rigorously ordering multiple cognitive contents and keeping the body in place. It's in these Renaissance medical and literary traditions, often closely connected,[108] that modern history and philosophy of the human body helps to display strands of the fragility and disharmony of the decorum and discipline officially sought for, in, and between selves.

4.1 Secrets Within[109]

When Vesalius attacked ventricular faculty neuropsychology in the *Fabrica*, preferring to avoid theory of higher cognitive function, he used charged metaphors to describe and discredit traditional views.[110] Discussing the passage from the third to the fourth ventricle, he denies the existence of a controllable process by which fantasies may enter the seat of memory, which may then return its 'captives',[111] collected in 'the prison of memory', to the alleged seat of reason in the middle ventricle.[112] The language of confinement and domination is indeed appropriate to place memory schemes,[113] and provides one point of contact between memory and medicine. Imaginary anatomies, surviving from medieval through Renaissance metaphoric physiology, pictured nested internal organs as treasures, secrets to be kept safe, ordered, and in their 'natural' places.[114] In all the medieval models and schemata which structured medical theory, pathologies and confusions were understood not through the common architectural and artificial metaphors, but through analogies from animal and vegetal worlds in which improper matter intrudes across the seals of the human body.[115] Just as in the case of artificial memory, the projection inside of comprehensible and cleanly-structured external artifice functioned to secure an image of stability and inner discipline which was otherwise threatened by the fluidity and proneness to disorder of brain and body parts.

Potential for internal confusion was, then, even harder to deny in general 'pre-modern' physiology than in the case of memory. The open and porous body of traditional humoral theory provided a language structuring bodily experience, which could thus be tumultuous and dramatic, with body parts having their own affective capacities as boundaries between inner and outer are continually permeated.[116] Belief in the interconvertibility of body fluids (blood, milk, fat, sperm, sweat, tears) and processes (lactation, menstruation, concoctions) made it hard to separate brain function from the active runny parts of the churning internal environment with its needs for purging, bleeding, and sealing.[117]

Restoring decorum by localising and isolating independent parts in a rigid order was unlikely to succeed in either general physiology or theories of memory. The breakdown of ventricular localisation made it desperately difficult for those still pushing localist models of memory to find physiological grounding.[118] But this led to no greater tolerance for confusion: the wish to

isolate, separate, and thus control items in body and mind remained even when the impossibility of doing so cleanly was recognised. Later iatromechanical theorists still advised on guarding the purity of the imagination against 'dangerous traces' by 'strategems' like thinking of 'eternity, or some other solid thought' to impose order and fixity on the fleeting spirits by sheer external will.[119] And in physiology, knowledge gained through anatomical practice across late Renaissance Europe required the destruction, usually violent, of a previous organisation in order to divide and classify.[120] It is one of the tenacious cliches about the late Renaissance that recognition of the cost and disruption incurred in the production of new knowledge and order was more visibly, spectacularly on display than in later, more 'civilised' times.[121]

4.2 Crucifying the Self, Dissolving the Self

Those who give way to violent passions, Burton warned in pithy summary of Renaissance moral psychology, 'are torn in pieces, as Actaeon was with his dogs, and crucify their own souls'.[122] The astonishing écorchés (flayed) figures in baroque landscapes of Renaissance anatomists like Casserio, Spieghel, and Bucretius who exaggerate the illustrative techniques used in the Vesalian muscle-men and skeletons,[123] grotesque bodies often kindly holding back the folds of their own skin to reveal body secrets, are a symptom of wider fascination with self-inflicted violence.[124] Despite increasing current study, even in non-psychoanalytic psychology, of control exercised over one's own memories and mental representations,[125] there is an oddity in wishing to separate one's self or will entirely from one's memories comparable to that of disembowelling one's own innards, to intensify conflict in the quest for greater order.

Donne's claim to have 'cut up mine own anatomy, dissected myself' was already conventional.[126] The myths of Marsyas and Actaeon, repeatedly renarrated through the Renaissance, provided a range of motifs for understanding the processes of tearing self from self in which the agents of violence, for instance Actaeon's hounds, were often interpreted as internalised metaphor for one's own snarling, conflicting thoughts and desires.[127] Models of psychological division, literary or philosophical, required physiologies of self-mastery. Sweeping away 'anie filthinesse' in 'the secret closets and private chambers of thine heart' was a physical as well as theological duty.[128] But how

can one dominate the cells, fibres, and spirits of one's own brain? The traditional psychomachia against rebellious passions never sat easily with physiological schemes. If distemper or 'lewed perturbations' have gripped our spirits, our 'intestine enemies' confusing reason,[129] it may be too late to tear the self 'that breeds all disquiet' from that other (true?) self 'that stilleth what the other hath raised'.[130]

This suggests a psychophysiological implementation or historical realisation of one strand of Stephen Greenblatt's schematic account of Renaissance self-creation. Greenblatt argued, around a series of literary and religious lives and case studies, that (i) Renaissance selves were fashioned in relation to some alien or hostile thing or power, that (ii) this alien could be constructed as chaotic or unformed, without order, that (iii) this chaotic alien could be internalised along with the authority which gains its identity from it, and that (iv) attacks on and suppression of such an alien could require excesses of power which threaten, efface, or dissolve the authoritative self which was meant to be defended.[131] My analysis of the memory arts starts at the third stage of this scheme, where the danger of confusion is always already internalised in 'natural' memory and requires the importation and imposition of external order as artificial memory to keep chaos at bay. The excess, frightening yet compulsive, sometimes produced in these exercises of theoretical and personal discipline encouraged Renaissance attention to suicide, dismemberment, and the other violations of self mentioned above. The effacement or loss of self which Greenblatt also mentions is the final topic here.

John Carey's account of Donne fixes on 'both [Donne's] urge to blend and the inescapable selfhood which prompted and frustrated it'.[132] Processes of blending, melding, merging into some new mixture in which the original ingredients are effaced, melting individuality away, could exert strong attractions at social, interpersonal, psychological, and physical levels. Symptoms, all familiar in their own domain, include dispute over whether or not angels make love by total interpenetration, mixing in the same place, horror of and fascination with hybrids and monstrous mixtures in biology and proto-anthropology, moral indignation at various kinds of hermaphroditism and 'confusion of sexes', and concerns to guarantee immunity from melding and evil mixture with people or things at alien places on the various hierarchies of 'degree'.

Between selves, the key question was whether particular contacts were merely the juxtapositions of impenetrable individuals who would remain

unchanged by the process, or strong fusions in which restoration to a former state, retention of identity through the mix, was impossible. Irrevocable alteration could be both sought and resisted. In some contexts, notably religious, the merging would be into a greater Other which simply incorporated more into itself, as the sea will swallow a winedrop, but in more challenging cases, of true confusion, none of the ingredients would survive. It is Diana/Cynthia in Jonson's treatment of the Actaeon myth who punishes the corrupt and disguised masquers who 'mix themselves with others of the court':[133] these self-lovers have not given themselves up, have not been drawn from themselves as Petrarch/Actaeon claimed to have been when transformed after seeing Laura/Diana.[134] Revengers in Jacobean theatre dissolve their identities in ambiguous ways: critics still battle over the extent to which disguised malcontent/rulers in plays like *Measure for Measure* and Marston's *The Malcontent* retain any control over the mixing process or emerge from reseparation with identities intact.[135]

Mixtures of sexes, lovers, mutual body parts, of friends, social roles, and constitutions can all seem more enticing than internal psychological blends between memories or mental representations. Donne's uses of words as ways in to other bodies as well as his own, his placings of towns, farms, instruments, and measures in interior locales, his fascinations with melting kisses or inner plaits and folds, are fine examples of the struggle to achieve control of recalcitrant matter by seeking to embrace and order material mixtures from the inside.[136] Yet, I have argued, related patterns operated in the context of memory, mind, and brain. The sheer difficulty of an immanent account of mixtures is one result of the inquiry: interference cannot, it has often appeared, be controlled without an external agent. Naturalistic theories of mind and self find it little easier genuinely now to acknowledge all the odd phenomena of confusion which a focus on such mixtures reveals. The over-homogenising of many historical problems, domains, and attitudes which this paper has risked is perhaps worthwhile if some of these strange fields have been productively addressed and connected.

I have suggested that it is possible to find hints, in medieval and Renaissance accounts and practices of representation, of a form of representation which is neither word nor image. Related perhaps to schemes for external brachygraphy, these quasi-distributed mental representations would work by condensation and compression. As models for the mind, use of both

linguistic and pictorial representations showed how rigid boundaries between items could be retained, limiting data compression and rendering context effects unlikely, or at least extrinsic to the medium, by having exact semantic stability across instantiations enforced. Such atomistic models were the only ones which could be easily articulated explicitly, due to the shared assumption that 'order is what is needed', rather than compression, for successful representation.[137] It is certainly hard to find explicit historical evidence for this bypassing of the word/image dichotomy: acknowledgement of semantic instability as explanandum for theories of mind would have violated methodological presuppositions about order in cognition, cosmos, and culture.

But by enlisting evidence about attitudes to psychological control, I have tried to show that indirect evidence can be found. Alongside obvious historical dreams of a pristine interior, that realm within of true freedom untainted by spirits, traces, and this-worldly power, there was doubt about the ideal of an over-ordered atomistic inner space. In seeking to supplement the weakness of inner capacities with external representational aids, to help the active self with passive and derivative storage, theorists could almost confine the scope of the 'active' out of existence (natural memory requires, by its weak nature, artifice). Shaping the self by moulding its representations, seeking to keep representation transparent, perfect, clean, and well-bounded, could in effect render it opaque, elaborate, filthy, fuzzy. Tensions between ethics and physiology, or between containing the self and dissolving the self, are formed in specific periods, in which particular kinds of interference are resisted. Behind the truism that medieval, Renaissance, and seventeenth-century philosophers were concerned urgently with the construction and maintenance of order in the mind as well as in society and world, there are still many leads to pursue towards the cognitive and cultural importance of the catastrophic confusion they sought to avert.

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NOTES

[1] Copernicus, *De revolutionibus orbium coelestium* (1543), quoted by Kemp in this volume.

[2] Kemp, this volume. The chance to read in advance the papers by Martin Kemp, Jamie Kassler, and Jim Franklin gave me considerable help in constructing my case here. My thanks to Kassler, Franklin, and Doris McIlwain for useful comments.

[3] Classic literary/history of ideas studies include E.M.W. Tillyard, *The Elizabethan World Picture* (London, 1943), *passim*; R. Colie, *Paradoxia Epidemica* (Princeton, 1966); R. Grudin, *Shakespeare and Renaissance Contrariety* (Los Angeles, 1979).

[4] See Jonathan Dollimore's provocative review in *Radical Tragedy* 2nd ed. (Brighton, 1989), introduction (xi-lxviii); other strands of the new history can be approached through Michel Foucault, *The Order of Things* (London, 1970), e.g., pp. 71ff; M.M. Slaughter, *Universal Languages and Scientific Taxonomy in the Seventeenth Century* (Cambridge, 1982) pp. 1-11, 212-17; A. Fletcher and J. Stevenson (eds), *Order and Disorder in Early Modern England* (Cambridge, 1985); Otto Mayr, *Authority, Liberty, and Automatic Machinery in Early Modern Europe* (Baltimore, 1986) pp. 115-36 and 181-9; Stephen L. Collins, *From Divine Cosmos to Sovereign State* (Oxford, 1989) pp. 3-39; Annabel Patterson, 'The very name of the game: Theories of order and disorder', in T. Healy and J. Sawday (eds), *Literature and the English Civil War* (Cambridge, 1990) pp. 21-37; Joy Wiltenburg, *Disorderly Women and Female Power in the Street Literature of Early Modern England and Germany* (Charlottesville, 1992) chs 2 and 10.

[5] Elaine Scarry, 'Donne: 'but yet the body is his booke'', in Scarry (ed.), *Literature and the Body* (Baltimore, 1988) pp. 70-105, especially 95-6 and notes 19 and 22, pp. 101-2.

[6] Stephen Greenblatt, *Renaissance Self-Fashioning: From More to Shakespeare* (Chicago, 1980), especially p. 9 on the internalization of 'the alien' constructed as chaotic. See also section 4 below on Renaissance destructions and dissolutions of self.

[7] As, most notably, in debates between Kosslyn and Pylyshyn, discussed in Jim Franklin's paper in this volume. See also Michael Tye, *The Imagery Debate* (Cambridge, MA, 1991).

[8] This is the briefest and most informal account of the rudiments of distributed representation. Good introductions include Andy Clark, *Microcognition* (Cambridge, MA, 1989) ch. 5; William Bechtel and Adele Abrahamsen, *Connectionism and the Mind* (Oxford, 1991) ch. 2; Patricia Churchland and Terrence Sejnowski, *The Computational Brain* (Cambridge, MA, 1992) pp. 163ff.

[9] Tim van Gelder, 'What is the 'D' in 'PDP'? A survey of the concept of distribution', in W. Ramsey, S. Stich, and D. Rumelhart (eds), *Philosophy and Connectionist Theory* (Hillsdale, N.J., 1991) pp. 33-59; van Gelder, 'Defining 'distributed representation'', *Connection Science* 4 (1992) 175-91; John Haugeland, 'Representational genera', in *Philosophy and Connectionist Theory*, pp. 61-89; also relevant is Terence Horgan and John Tienson, 'Representations without rules', *Philosophical Topics* 17 (1989) 147-74.

[10] For this point see G.E. Hinton, J.L. McClelland, & D.E. Rumelhart, 'Distributed representation', in Rumelhart and McClelland (eds), *Parallel Distributed Processing*, vol.1 (Cambridge, MA, 1986) pp. 77-109, at p.80; and compare John Locke, Essay II.10.2: '... our *Ideas* are said to be in our Memories, when indeed, they are actually no where, but only there is an ability in the Mind, when it will, to revive them again'. I have argued extensively that parallels between the dispositional accounts of memory of contemporary and early modern theorists are not coincidental, but depend on shared neurophilosophical views of distributed representation which are independent from specific realisations in animal spirit patterns, vibratiuncles, or neural nets: John Sutton, *Connecting Memory Traces: Studies of Neurophilosophical Theories of Memory, Mental Representation, and Personal Identity from Descartes to New Connectionism*, Ph.D thesis, University of Sydney, 1993. The present arguments do not, however, depend on such a strong case.

[11] J.L. McClelland and D.E. Rumelhart, 'A distributed model of human learning and memory', in McClelland and Rumelhart (eds), *Parallel Distributed Processing*, vol.2 (Cambridge, MA, 1986) pp. 170-215.

[12] M. McCloskey and N.J. Cohen, 'Catastrophic interference in connectionist networks: The sequential learning problem', *Psychology of Learning and Motivation* 24 (1989) 109-65; Robert

M. French, 'Semi-distributed representations and catastrophic forgetting in connectionist networks', *Connection Science* 4 (1992) 365-77, with references to earlier discussions.

[13] Sutton, *Connecting Memory Traces*: ch. 2 on the Cartesian philosophy of the brain, ch. 3 on English responses to Descartes, ch. 4 on Locke, Hume, and associationism, and ch. 5 on Hartley and his critics.

[14] On animal spirits see my *Connecting Memory Traces*, and Sutton, 'The quick and nimble animal spirits: A case study in the elimination of psychophysiological constructs', forthcoming.

[15] D.P. Walker, 'Francis Bacon and *Spiritus*', reprinted in P. Gouk (ed.), *Music, Spirit, and Language in the Renaissance* (London, 1985) p. 126: as well as the other papers in this volume see also Walker, *Spiritual and Demonic Magic from Ficino to Campanella* (1958, reprinted Notre Dame, 1975), e.g., pp. 27-9, 189-92, 230-1; Walker, 'Medical spirits and God and the soul', in M. Fattori and M. Bianchi (eds), *Spiritus* (Rome, 1984) pp. 223-44. Walker praised Vesalius and other sixteenth-century theorists in whose thought *spiritus* 'rarely plays a conspicuous part', in contrast to Bacon and Descartes, for wasting little time on the animal spirits, apparently believing that there were no outstanding explananda for which spirits or other hypothetical entities were needed (Walker, 'Ficino's 'spiritus' and music', p. 150). Compare Notes 112 and 113 below on Vesalius.

[16] Kemp, this volume, on Vesalius, p. 21.

[17] Frances Yates, *The Art of Memory* (London, 1966); Mary Carruthers, *The Book of Memory* (Cambridge, 1990); also Janet Coleman, *Ancient and Medieval Memories* (Cambridge, 1992), which I haven't been able fully to benefit from. I give most primary source references to the quotations in Yates and Carruthers, hoping that the interest of their discussions in this new context will make up for my imperfect understanding of medieval contexts. A provocative summary of the arts of memory is Lina Bolzoni, 'The play of images: The art of memory from its origins to the seventeenth century', in P. Corsi (ed.), *The Enchanted Loom: Chapters in the History of Neuroscience* (Oxford, 1991) pp. 16-26. There is a different approach to early medieval memory in James Fentress and Chris Wickham, *Social Memory* (Oxford, 1992) pp. 11-5 and ch. 4.

[18] Carruthers, *The Book of Memory*, p. 130: compare Coleman, *Ancient and Medieval Memories*, pp. xiii-xviii and 600-14.

[19] John Willis, *The Art of Memory as it Dependeth upon Places and Ideas* (London, 1621; reprinted New York and Amsterdam, 1973) p. 52. This was a partial translation by the author of his *Mnemonica* (1618): I haven't seen the full 1661 translation. See Yates, *Art of Memory*, pp. 324-6 and n.40, p. 415.

[20] Division is stressed, for example, by Martianus Capella (Yates, *Art of Memory*, p. 64), and Hugh of St. Victor (Carruthers, *Book of Memory*, p. 83).

[21] In Carruthers, *Book of Memory*, p. 113. The same point is often made within the wax-block tradition of memory models in encouragements to imprint individual ideas deeply, separately from all others (Willis, *Art of Memory*, pp. 52-3).

[22] Aristotle, De Memoria, 452a; *Ad Herennium* (Yates, *Art of Memory*, p. 22); Hugh of St. Victor (Carruthers, *Book of Memory*, p. 82).

[23] This formulation is from Robert Hooke's localist model of memory, in his *Lectures of Light*, in *The Posthumous Works of Robert Hooke*, R. Waller (ed.) (London, 1705) p. 142. Compare Kenelm Digby, *Two Treatises* (Paris, 1644, reprinted New York, 1978) pp. 284-5. On the local models of Digby and Hooke see my *Connecting Memory Traces* (Note 10) ch. 3, and 'Inner discipline: Confusion and cognition in English responses to Descartes' theory of memory', forthcoming. I was encouraged to look to Digby, Glanvill, and Hooke by Jamie Kassler, who takes

a quite different approach in her *Inner Music: Hobbes, Hooke and North on Internal Character* (London, 1995), ch. 3.

[24] Carruthers, *Book of Memory*, p. 61; compare pp. 75-77 on the parallel with descriptions of error given by the Russian mnemonist Shereshevski (S.) in A.R. Luria, *The Mind of a Mnemonist* (New York, 1968). Carruthers uses this case study to throw light on medieval memory sensitively; but she fails to stress how alien from 'normal' twentieth-century remembering S.'s method was, or how inexplicable Luria found the case. Carruthers, like Coleman, wants to reveal radical differences between medieval and modern *practices*, as well as theories, of remembering. I would add that the mass of evidence for the centrality of local memory schemes also suggests intense awareness of the fragility of 'natural' memory: stored items need to be rigorously ordered, isolated one from another, by technique and control just because this is not how they would be without the intervention of an external trainer.

[25] In Willis' system, for example, there are 18 repositories, each with two rooms: we can thus safely remember 36 items without overcharging our memory (Willis, *Art of Memory*, p. 36).

[26] Walter Pagel, 'Medieval and Renaissance contributions to knowledge of the brain and its functions', in *The History and Philosophy of Knowledge of the Brain and its Functions* (Oxford, 1958) pp. 95-114, especially 97-103; Katherine Park, 'The organic soul', in C.B. Schmitt & Q. Skinner (eds), *The Cambridge History of Renaissance Philosophy* (Cambridge, 1988) pp. 464-84. There are useful lists of the diverse catalogues of the internal senses offered by a large number of Arab and medieval writers in G.W. Bruyn, 'The Seat of the Soul', in F.C. Rose & W.F. Bynum (eds), *Historical Aspects of the Neurosciences* (New York, 1982) pp. 55-81.

[27] Hinton, McClelland, and Rumelhart, 'Distributed Representation' (Note 10) p. 79. There is a genuine issue here, about whether or not memory is separate from any 'executive' which deposits and accesses memories: but this can, at least initially, be kept clear of the problem of the form of representation within memory.

[28] Reginald Pecock, *The Folewer to the Donet*, 30, in E. Ruth Harvey, *The Inward Wits: Psychological Theory in the Middle Ages and the Renaissance* (London, 1975) p. 61; compare her discussion of Nemesius, pp. 31-7.

[29] Fortunatianus (Carruthers, *Book of Memory*, p. 86; cf. p. 80).

[30] Carruthers, *Book of Memory*, pp. 92f, 107f, 129 on grids, alphabets, and lines; Yates, *Art of Memory*, pp. 87, 115-6 on lists and plans, ch. 15 on stages and rooms. More complex background places were entire image systems like the Bestiary (Carruthers, *Book of Memory*, pp. 126-7). Some such systems (internal and external) immediately raise the issue of whether or not there was a centre: Penelope Reed Doob argues, for example (*The Idea of the Labyrinth* (Ithaca, 1990) pp. 51-63), that most mazes and labyrinths before the twentieth century had a centre meant to order, through controlled art, the wanderer's confused error.

[31] *Ad Herennium* (Yates, *Art of Memory*, p. 23).

[32] Which could be called self, soul, reason, will, or fancy. The point here is that it is a cognitive agent separate from the representations in memory: it is something which has memories, rather than *being* (in part) its memories. Storage is distinct from processing, the knowledge base from the executive.

[33] Carruthers, *Book of Memory*, pp. 131-2 and 146 on bins and cells; p. 7 on random access memory. Carruthers here equates 'rigid order' with 'easily reconstructible order'. This way of putting it is guided by the lengthy advices given for finding one's way around one's own memory system. But these methods are not genuinely reconstructive, for after careful local encoding all the images are always already there, waiting: they have only to be found by an active, searching consciousness or subject, and do not, like distributed memory representations, have themselves

to be recreated anew each time. This is what gives local representations their characteristic context-independence.

[34] Martianus Capella (Yates, *Art of Memory* p. 64 and Carruthers, *Book of Memory*, p. 147). Carruthers is sensitive to the ways the vast contemporary literatures on textuality, orality, and *mentalités* can help with or be upset by specific historical problems.

[35] David Farrell Krell, *Of Memory, Reminiscence, and Writing: On the Verge* (Bloomington, 1990), introduction and *passim*. For further examples of the engrammatological programme see Carruthers, *Book of Memory*, pp. 8-10, 16, 60, 89, 111; Yates, *Art of Memory*, p. 22 (*Ad Herennium*) p. 64 (Martianus) p. 213 (Bruno) p. 262 (Dicson); Coleman, *Ancient and Medieval Memories*, pp. 157-68 (Anselm). For recent work on memory metaphors see also Note 101 below.

[36] On the 'mind as text' image fuelling contemporary cognitivist local models see David Kirsh, 'When is information explicitly represented?', in P. Hanson (ed.), *Information, Language, and Cognition* (Vancouver, 1990) pp. 340-65, especially pp. 350-60; Andy Clark, *Associative Engines: Connectionism, Concepts, and Representational change* (Cambridge, MA, 1993) pp. 8-15, 39-40, 115-29.

[37] Shakespeare, *Hamlet*, I.v.90-112.

[38] Willis, *Art of Memory*, preface (unpaginated): more strongly still, he says that writing 'doth for speed and certaintie go beyond any art of Memorie': also ch. 16, pp. 96-104 on how to 'despatch' memory items and leave internal places empty again. Bacon in *De augmentis scientiarum* II.5 argues that 'the great help to the memory is *writing*', which must supplement 'the natural and naked force of thought and memory' (in D.J. Herrmann and R. Chaffin (eds), *Memory in Historical Perspective* (New York, 1988) p. 167).

[39] Willis, *Art of Memory, ch. 15, pp. 93-5.*

[40] *Hamlet* I.v.98, 107.

[41] St Bernard, in Coleman, *Ancient and Medieval Memories*, ch. 11, especially pp. 182, 185, 191: compare her ch. 5 on Plotinus. Bernard's image of the memory as a stomach where dirty and bitter multiple particulars reside and ache invites analysis in terms of the retentive, evacuative, and contaminatory functions played by body memory in a dualistic scheme: for a suggestive method in a later historical context see Frank Whigham, 'Reading social conflict in the alimentary tract: more on the body in Renaissance drama', *ELH* 55 (1988) 333-50.

42 The privileging of autonomous active reminiscence could be sanctioned in Aristotle (*De Memoria* 451b-452a) and Augustine, *Confessions* 10.8 (on the power of the 'I' to drive away naughty candidate memories until 'what I wish for be unveiled, and appear in sight, out of its secret place'). Compare also Aquinas and Averroes, in Carruthers, *Book of Memory*, pp. 58-60.

[43] Kenelm Digby, *Two Treatises* (Note 23) pp. 285-6.

[44] This gives rise to the common charge of circularity against all trace theories of memory: if either the subject or some internal agent already knows which trace is the one it wants, the postulation of the trace can seem redundant, since there is no further need to bridge the temporal gulf between experience and recall. I argue elsewhere that such objections have force only against localist models: Sutton, *Connecting Memory Traces*, ch. 6, with discussion of the literature.

[45] Hugh of St Victor (Carruthers, *Book of Memory*, p. 71). Carruthers describes well the basis of the character-moulding tasks of memory training in the Aristotelian typography of the stamping of memories on inner wax.

[46] Yates, *Art of Memory*, p. 266 (William Perkins' Ramist art) and p. 298 (the opposed art and 'inner discipline' of Bruno); Carruthers, *Book of Memory*, pp. 46, 78.

[47] Carruthers, *Book of Memory*, pp. 70, 78; Yates, *Art of Memory*, pp. 30, 63-4, 70; Willis, *Art of Memory*, preface (the art does not hurt, but corroborates natural memory). Compare Mary Pardo, 'Memory, imagination, figuration: Leonardo da Vinci and the painter's mind', in S. Kuchler and W. Melion (eds), *Images of Memory* (Washington, 1991) pp. 47-73 and 212-24, for Leonardo's use of a 'sketch-pad memory' acting as 'a thesaurus of single impressions' to represent the dynamic action natural memory could not.

[48] Hugh of St Victor (Carruthers, *Book of Memory*, p. 83).

[49] Carruthers, *Book of Memory*, p. 84.

[50] Yates, *Art of Memory*, pp. 173-4, 227.

[51] Boncompagno (Yates, *Art of Memory*, p. 70).

[52] Aquinas (Yates, *Art of Memory*, p. 82).

[53] On the dispensability of memory in incorporeal and atemporal existence see Coleman, *Ancient and Medieval Memories*, pp. 62, 68, 72-3, 155. The idea that angels need no memory lasted: in Locke's *Essay* II.10.9, they 'constantly have in view the whole Scene of all their former actions', showing up by contrast the meagre human need to scramble for the past in the face of oblivion.

[54] Bruno's arts aimed to extract the deep 'order and series' from the 'inform chaos' of primordial elements and numbers. The point of using memorable forms is to achieve an ordered disposition of the memory items, 'necessary for the control of memory': this is tied directly to the demand for independence of the local items one from another, maintaining 'certain distinct intervals' which ensure the requisite form and order. See Yates, *Art of Memory*, pp. 213-4, 249; Yates, *Giordano Bruno and the Hermetic Tradition* (London, 1964), *passim*.

[55] Yates, *Art of Memory*, pp. 136, 206, 221.

[56] Yates, *Art of Memory*, p. 159 (Ficino & Camillo) pp. 221-2 and 250-1 and 304 (Bruno).

[57] On the general problem of universals in Aristotelian Renaissance philosophy of mind see H. Skulsky, 'Paduan epistemology and the doctrine of one mind', *Journal of the History of Philosophy* 6 (1968) 341-61.

58 Joseph Glanvill, *The Vanity of Dogmatizing* (London, 1661, reprinted Brighton, 1970) p. 36; also p. 39 (against the view that memories are 'stored with infinite variety of divers, yea contrary motions, which must need interfere, thwart, and obstruct on another', when 'there would be nothing within us, but Ataxy and disorder').

[59] Sutton, *Connecting Memory Traces* (Note 10) chs 2-3.

[60] Glanvill, *Vanity of Dogmatizing*, 36 (my emphasis).

[61] *Ibid.,* pp. 37-39 and 1-16, especially 4-5, and my 'Inner Discipline' (Note 23).

[62] Carruthers, *Book of Memory*, p. 62, defining a 'common metaphorical extension in Latin of the word *silva*'.

[63] Thomas of Waleys (Carruthers, *Book of Memory*, p. 103).

[64] Carruthers, *Book of Memory*, p. 7.

[65] Cicero, *De oratore* (Yates, *Art of Memory*, p. 34). This leads to advice like John Willis' (Note 25) about the necessity to keep the number of memorabilia down to avoid overcrowding.

[66] Robert Boyle, *Works* (ed. T. Birch [1772], Hildesheim, 1965), 4.454; Robert Hooke, *Lectures on Light* (Note 23) pp. 143-4; J.J. MacIntosh, 'Perception and imagination in Descartes, Boyle, and Hooke', *Canadian Journal of Philosophy* 13 (1983) 327-52. On the alternative Cartesian distributed model of memory, where items are not independent one from another but are dispositions for reconstruction of an explicit pattern of motions in the animal spirits, this problem

could be dismissed: see Nicolas Malebranche, *The Search After Truth* (Columbus, 1980) II.I.5.iii, p.107, and my *Connecting Memory Traces*, chs 2-3.

[67] De bono 11 (Carruthers, *Book of Memory*, p. 138).

[68] Aristotle, *De memoria* 2, 453ab; *De somno* 3, 456a-457a; *De somniis* 2-3, 459a-461b; with *De generatione et corruptione* I.10, 327a-328b; compare Plato, *Theaetetus* 191de, 194c-195a; Krell, *Of Memory, Reminiscence, and Writing* (Note 35) ch. 2.

[69] There was also basic advice on how to avoid mnemonic confusion and perturbation by choosing carefully the context of encoding (Yates, *Art of Memory*, pp. 79, 110).

[70] *Hamlet* I.v.102-4.

[71] Coleman, *Ancient and Medieval Memories*, chs 5 and 11.

[72] Bruno's follower Dicson in Yates, *Art of Memory*, p. 263; also p. 315 (Fludd's spiritual memorizing to 'overcome the confusions of Babel').

[73] Aquinas in Carruthers, *Book of Memory*, p. 68. For the ancient background compare T.J. Tracy, *Physiological Theory and the Doctrine of the Mean in Plato and Aristotle* (Chicago, 1969).

[74] Zabarella, *De Mistione* [1594], with H.H. Joachim, 'Aristotle's conception of chemical combination', *Journal of Philology* 29 (1904) 72-86; Harald A.T. Reiche, *Empedoclean Mixture, Eudoxan Astronomy, and Aristotle's Connate Pneuma* (Amsterdam, 1960), especially ch. 2 on immanent and transcendent models of mixture; Sutton, 'Confusion and mixture in Aristotle's psychology', in preparation. Yates claimed (*Art of Memory*, pp. 163, 169-170) that the idea of thinking of successful artificial memories as proper mixtures was new with Ficino and the Italian academies, but this seems unlikely, given the power of the notions of proportion and balance in ancient and medieval medical traditions: see for example R. Klibansky, E. Panofsky, F. Saxl, *Saturn and Melancholy* (London, 1964) Part One.

[75] The complex relations between the art of memory and physiology play only passing roles in the existing histories: see Yates, *Art of Memory*, p. 70 (Boncompagno on humours) p. 80 (Albertus on melancholy) p. 191 (Ramon Lull on the use of medicines and plasters); Carruthers, *Book of Memory*, pp. 47-51 (general physiology of memory).

[76] The use of exceptional images goes back to the weird examples of the art of memory used in the *Ad Herennium* to supplement nature with art: see Yates' outstanding commentary, *Art of Memory*, pp. 25-30.

[77] Yates, *Art of Memory*, pp. 112, 203, 242, 358-9; Carruthers, *Book of Memory*, p. 109 and ch. 4.

[78] Yates, *Art of Memory*, pp. 229-32 (Ramus) p. 266 (Perkins).

[79] For some reactions against confusion see Yates, *Art of Memory*, p. 133 (moral humanists) pp. 231, 268-70 (Ramists), 255 (Protestants).

[80] Thomas Bradwardine, in Carruthers' description (*Book of Memory*, pp. 132-4 on the need for movement in recall to 'glue' the order of images, 144, 149-150 on matrices).

[81] Yates, *Art of Memory*, chs 8 (Lull) pp. 9, 11, 13, and 14 (Bruno), especially pp. 203, 249.

[82] For the fold see Bruno, *The Secret of Seals* (in Yates, *Art of Memory*, p. 243) on 'The Field' which is the memory, 'the ample folds of which are to be worked upon by the art of places and of images'; compare Gilles Deleuze, *The Fold: Leibniz and the Baroque* (Minneapolis, 1993), e.g., pp. 23-4. For Bruno against multiplicity see Yates, *Art of Memory*, pp. 222, 250-1, 296 (also 365-72 on Bruno, Leibniz, and memory).

[83] For a recent defence of atomism in theory of meaning against a range of holisms see J.A. Fodor and E. Lepore, *Holism: A Shopper's Guide* (Oxford, 1992), especially ch. 1. Wolfgang Kemp has argued ('Visual narratives, memory, and the medieval *Esprit du System*', in Kuchler & Melion (eds), *Images of Memory* (Note 47) pp. 87-108, 226-229) for a stricter distinction than Yates made between ancient mnemonic image-based systems, and medieval 'schematic-systematic' systems using figure and diagram. But he acknowledges that the two coexisted from the thirteenth century at least: my claim then is that their differences mattered less than the shared conceptual commitment to atomism and order.

[84] Such an account can spring from some forms of 'holism' in the theory of meaning, from the chemical (as opposed to mechanical) metaphors within the associationist tradition, or from a connectionist theory of distributed representation.

[85] Michel Serres, *Hermes II: l'interference* (Paris, 1972); Serres, *Hermes: Literature, Science, Philosophy*, J.V. Harari and D.F. Bell (eds) (Baltimore, 1982); N. Katherine Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science* (Ithaca, 1990); Hayles (ed.), *Chaos and Order: Complex Dynamics in Literature and Science* (Chicago, 1991); Alexander Argyros, *A Blessed Rage for Order* (Ann Arbor, 1991); Philip Kuberski, *Chaosmos* (New York, 1994).

[86] Here as often in this paper it would be natural to question the relation of Descartes to the diverging traditions of the art of memory and the medical psychophysiology of memory. His discussion, in a physiological context, of the uses of 'compact' 'abbreviated representations' as 'safeguards against lapses of memory' (*Rules for the Direction of the Mind*, rule 12, AT X.417, *The Philosophical Writings of Descartes*, J. Cottingham, R. Stoothoff, and D. Murdoch (trans.) vol.1 (Cambridge, 1985) p. 43), is clearly relevant. Descartes' early rejection of the art of memory (*Cogitationes Privatae*, AT X.230) is, however, more complicated than is often allowed, and his attitude does change as he comes to construct a new physiological system. See my *Connecting Memory Traces*, ch. 2, and the forthcoming edition of Descartes' *Treatise on Man* by Stephen Gaukroger and John Sutton. A good recent paper on these problems is Dennis Sepper, 'Imagination, 'ingenium', and memory art', in S. Voss (ed.), *Essays on the Philosophy and Science of René Descartes* (Cambridge, 1993) pp. 142-61; also Paolo Rossi, *Clavis Universalis* (Milan, 1960) pp. 145, 153-61; Yates, *Art of Memory*, pp. 359-60; MacIntosh, 'Perception and imagination...' (Note 66); Dalia Judowitz, *Subjectivity and Representation in Descartes* (Cambridge, 1988) pp. 25-32; Stephen Gaukroger, *Cartesian Logic* (Oxford, 1989) pp. 31-38, 46ff.; Krell, *Of Memory, Reminiscence, and Writing* (Note 35) ch. 2.

[87] Henry More, *The Immortality of the Soul, in A Collection of Several Philosophical Writings* ([2 vols., 1662] reprinted New York, 1978) vol.2, Book II ch. 2 paragraph 7 (II.2.7) p. 68.

[88] More, *Immortality*... II.7.16, p. 93; II.10.9, p. 105.

[89] More, *An Appendix to the foregoing Antidote against Atheism*, in *A Collection...* vol.1, ch. 10 paragraph 10, p.173.

[90] *Immortality*... II.10.2, p. 102; Appendix, p. 173.

[91] *Immortality*... II.7.16, p. 93.

[92] *Immortality*... II.11.4, p. 107.

[93] L. Wittgenstein, *Zettel* (Oxford, 1967), 612 (= *Remarks on the Philosophy of Psychology* vol.1 [Oxford, 1980], 908).

[94] 'The *Memory* is in the *Soul*, and not in the *Brain*' (More, *Immortality*... II.11.4, p.107). For relevant Wittgensteinian remarks see my *Connecting Memory Traces*, ch. 8, and David Stern, 'Models of memory: Wittgenstein and cognitive science', *Philosophical Psychology* 4 (1991)

203-18; also A.J. Cascardi, 'Remembering', *Review of Metaphysics* 38 (1984) 275-302. More, unlike Wittgenstein, thinks or hopes that a dualist theory can replace the materialist ones.

[95] Yates, *Art of Memory*, pp. 30-1, 39, 55; Carruthers, *Book of Memory*, p. 124 on the medieval ars notataria and its links with the arts of memory.

[96] Yates, *Art of Memory*, pp. 76-7 (Albertus Magnus, *De Bono*).

[97] Carruthers, *Book of Memory*, pp. 84-5, 92 (Hugh of St Victor's 'principle of shortness').

[98] Carruthers, *Book of Memory*, p. 53 (using Avicenna and Aristotle, *De Anima* III.11.434a), and ch. 2, *passim*; David Summers, *The Judgment of Sense: Renaissance Naturalism and the Rise of Aesthetics* (Cambridge, 1987) chs 4-6 and 9.

[99] Vivian Salmon, *The Works of Francis Lodwick* (London, 1972) pp. 60-67, 110-116, 144-145: shorthand was almost exclusively developed in England until the late seventeenth century. John Willis, author of the 1618 *Mnemonica*, had previously (1602) written on stenography. The *O.E.D.* refers to 'the Shorthand of the Mind' which 'crowds a great deal into a little space' (J. Collier, *O.E.D.* s.v. 'shorthand'). Earlier Renaissance theorists including Trithemius (d.1516) and Agrippa had linked ciphers and spirits as media of information-processing and representation: Walker, *Spiritual and Demonic Magic* (Note 15) pp. 85-96.

[100] For this point in the modern context see Andy Clark, 'Connectionism, competence, and explanation', *British Journal for the Philosophy of Science* 41 (1990) 195-222; and more generally Hubert and Stuart Dreyfus, 'Making a mind versus modelling the brain', in S. Graubard (ed.), *The Artificial Intelligence Debate* (Cambridge, MA, 1988) pp. 15-41.

[101] Sound general work on metaphors of memory and mind includes John C. Marshall and David M. Fryar, 'Speak, Memory! An introduction to some historic studies of remembering and forgetting', in M.M. Gruneberg and R. Morris (eds), *Aspects of Memory* (London, 1978) pp. 1-25; H.L. Roediger, 'Memory metaphors in cognitive psychology', *Memory and Cognition* 8 (1980) 231-46; Robert F. Belli, 'Mechanist and organicist parallels between theories of memory and science', *Journal of Mind and Behavior* 7 (1986) 63-86; Michael S. Kearns, *Metaphors of Mind in Fiction and Psychology* (Lexington, 1987) chs 1-2; David Leary (ed.), *Metaphors in the History of Psychology* (Cambridge, 1990).

[102] Intellectual memory: Eckhard Kessler, 'The intellective soul', in Schmitt and Skinner (eds), *Cambridge History of Renaissance Philosophy* (Note 26) pp. 485-534, at pp.510-7; Descartes to Mersenne, 1.4.1640 and 6.8.1640, AT III.45 and 142, with the work on Descartes cited in Note 86; also Paul Landormy, 'La mémoire corporelle et la mémoire intellectuelle dans la philosophie de Descartes', *Bibliothèque* 4 (Paris, 1902) 259-98.

[103] This point was both motivation and support for belief in bodily resurrection, an important context for all these debates: see Stephen Davis, 'Traditional Christian Belief in the Resurrection of the Body', *New Scholasticism* 62 (1988) 72-97, and Caroline Walker Bynum, 'Material continuity, personal survival, and the resurrection of the body', in her *Fragmentation and Redemption* (New York, 1992) pp. 239-97.

[104] As Hume knew, the emergence of this kind of philosophy of self was historically and culturally specific (*Treatise on Human Nature* I.iv.6 on why it has 'become so great a question in philosophy, especially of late years in England...'). On accounts of modern 'origins' of 'the individual' see Sylvana Tomaselli, 'The first person: Descartes, Locke, and mind-body dualism', *History of Science* 22 (1984) 185-205.

[105] Compare Georges Canguilhem, *The Normal and the Pathological* (1966, reprinted New York, 1991) pp. 33-4; and Jamie Kassler's account of Hobbes' physics of the self in this volume.

[106] On ecstasis in Renaissance philosophy see M.A. Screech, *Erasmus: Ecstasy and the Praise of Folly* (London, 1980). On the philosophical dimensions of Averroism in Italy see Skulsky, 'Paduan epistemology...' (Note 57); Martin L. Pine, *Pietro Pomponazzi: Radical Philosopher of the Italian Renaissance* (Padua, 1986) pp. 55-60 and 78-88.

[107] Pietro Pomponazzi, *De immortalitate animae* (1516), trans. W.H. Hay in E. Cassirer, P.O. Kristeller, J.H. Randall (eds) *The Renaissance Philosophy of Man* (Chicago, 1948) pp. 280-381, with Randall's introduction, 257-79; Pine, *Pietro Pomponazzi*, chs 1-2; Brian D. Copenhaver, 'Did science have a Renaissance?', *Isis* 83 (1992) 387-407, especially pp. 388-401 on Pomponazzian method and historiography. Accepting only 'relative' immortality for the intellect (as a shadow of fully immaterial intelligences) since the early 1500s, Pomponazzi's position grew increasingly less orthodox, despite the controversy, and in *De Nutritione* (1521) he argued that intellect is both extended and divisible.

[108] For example, Etienne Dolet, who celebrated in Latin verse the good fortune of a hanged criminal dissected in 1537 by Dolet's friend Rabelais, was a pupil and follower of Pomponazzi: see Mikhail Bakhtin, *Rabelais and His World*, trans. H. Iswolsky (Bloomington, 1984) pp. 355-62.

[109] 'Within are secrets': Middleton and Rowley, *The Changeling*, I.1.166, quoted and applied in this context by Whigham, 'Reading social conflict in the alimentary tract' (Note 41) 341.

[110] Charles Singer, *Vesalius on the Human Brain* (Oxford, 1952) pp. 1-6, 39-40, 49-50 (Book 7, chs 1, 6, 10).

[111] *Vesalius on the Human Brain*, 49: the word is 'fures', which as Singer notes (n.72, p. 81) can mean captives, thieves, or thefts.

[112] *Ibid.*, pp. 49-50. Vesalius' central argument against such a view is theological. Since the relevant anatomical structures (for the passage of animal spirits between the ventricles) are common to humans and beasts, either a) the localisation of cognitive function in these structures is true only for humans, leaving beasts, impossibly, with useless structures, or b) beasts too have rational capacities for control of the relation between memories and reason (49-50: for comparative brain anatomy compare 6-7, 24). Note the assumption here: if memory and reason are localised, with a physical 'passage' between them, it must, at least in principle, be reason which 'commands' and operates the passage, refusing or permitting entrance to individual memory representations (49-50). It is not that Vesalius believes his denial of the antecedent of this conditional to solve the theoretical problems: he simply rejects the idea that such problems can (or should) be solved.

[113] Vesalius' own view of the arts of memory, mentioned by Kemp (this volume), seems to be in line with that of humanists who encouraged the use of external images and aids to strengthen natural memory while remaining sceptical of traditional schemes for the artificial projection of such aids inside the mind (on Erasmus and moderate humanist hostility to place memory systems see Yates, *Art of Memory* pp. 137-9, 160-2, 169, and compare Montaigne, *Essays* II.17 ['On Presumption'] on how excessive prescriptive attention to remembering, as to the bodily organs, can actually cause the failure of the function in question). Neither psychology nor neurophysiology, for Vesalius, could give such insight into functional architecture and mental representation. This gives some counter to praise like Walker's (Note 15) for Vesalius and other sixteenth-century scientists who avoided hypothetical internal entities like animal spirits: the cost was inability even to acknowledge as explananda any complex cognitive functions.

[114] Marie-Christine Pouchelle, *The Body and Surgery in the Middle Ages* ([1983] New Brunswick, 1990) chs 6-11, especially pp.132-6. Also useful is Danielle Jacquart and Claude Thomasset, *Sexuality and Medicine in the Middle Ages* ([1985] Cambridge, 1988), especially ch. 2.

[115] Pouchelle, *The Body and Surgery*, Part Two *passim*, especially pp. 158-9 and the metaphorical tables at 207-217. Pouchelle's detailed study of Henri de Mondeville also extends to a range of other medical writers.

[116] This relation between theory and experience, both quite alien to us, is most strongly argued for by Gail Kern Paster, *The Body Embarrassed: Drama and the Disciplines of Shame in Early Modern England* (Ithaca, 1993) pp. 1-22 and passim. It is a natural consequence of the dependence in humoural physiology of bodily *krasis* (proper blending) on temperature, climate, diet and the other non-naturals, with treatment being in part aiding the body's limited capacities temporarily to resist the immediate environment: see for example Klibansky *et al., Saturn and Melancholy* (Note 74); Owsei Temkin, *Galenism: Rise and Decline of a Medical Philosophy* (Ithaca, 1973) ch. 4; Nicholas Steneck, *Science and Creation in the Middle Ages* (Notre Dame, 1976) ch. 8; Nancy Siraisi, *Medieval and Early Renaissance Medicine* (Chicago, 1990) ch. 4. Much more of this permeability survived into seventeenth-century physiology, even of the most mechanistic variety, than is usually recognized: see Descartes, *Treatise of Man* AT XI.166-9, T.S. Hall (trans.) (Cambridge, MA, 1972) pp. 72-5 on the enormous variety of factors, within the external and internal circulatory schemes, which influence psychophysiological function by way of the blood and subtle animal spirits.

[117] Thomas Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (Cambridge, MA, 1990) pp. 35-43 and 103-8.

Digby and Hooke made valiant attempts to anchor independent local memories in cells (Digby) or along the coils and spirals of memory (Hooke): but interconnectedness and lack of independence within brain substances was recognized by most. On later problems of neural localization see for example W.F. Bynum, 'The Anatomical Method, Natural Theology, and the Functions of the Brain', *Isis* 64 (1973) 445-68; Kenneth Dewhurst and Edwin Clarke, *An Illustrated History of Brain Function* (London, 1973); Mary A.B. Brazier, *A History of Neurophysiology in the Seventeenth and Eighteenth Centuries* (New York, 1984); Robert G. Frank, 'Thomas Willis and His Circle: Brain and mind in seventeenth-century medicine', in G.S. Rousseau (ed.), *The Languages of Psyche* (Berkeley, 1990) pp. 107-46.

[119] Malebranche, *Search After Truth* (Note 66) V.8, p.388.

[120] Jan C.C. Rupp, 'Matters of life and death: The social and cultural conditions of the rise of anatomical theatres', *History of Science* 28 (1990) 263-87; Rupp, 'Michel Foucault, body politics, and the rise and expansion of modern anatomy', *Journal of Historical Sociology* 5 (1992) 31-60.

[121] Francis Barker, *The Tremulous Private Body* (London, 1984). Barker argues that these violences disappeared, or were hidden, as a distinction between public and docile or private bodies was carved through the seventeenth century. Yet it was not only in texts which explicitly display the cruelty of modern reason, like Swift's *A Tale of A Tub*, that new docility was challenged: even in what traditional histories of philosophy cast as passively mechanistic conceptions of an inert body housing a ghostly soul, the body was in fact always urgently active, its microprocesses being obsessively theorised (not forgotten), with vigilant theorists producing, rather than neglecting, its interventions between will and world.

[122] Robert Burton, *The Anatomy of Melancholy*, A.R. Shilleto (ed.), 3 vols. (London, 1926-7) I.298.

[123] K.B. Roberts and J.D.W. Tomlinson, *The Fabric of the Body* (Oxford, 1992) ch. 7, with an uneasy discussion of the convention on pp. 255-9.

[124] Jonathan Sawday, 'The Fate of Marsyas: Dissecting the Renaissance body', in L. Gent and N. Llewellyn (eds), *Renaissance Bodies* (London, 1990) pp. 111-35.

[125] Useful historical and contemporary papers in D. Wegner and J. Pennebaker (eds), *Handbook of Mental Control* (Englewood Cliffs, 1993).

[126] Devotions (1623, Michigan 1965), Meditation 9, p. 56 (cf. p. 60); compare Lyly's (1578) Euphues going off 'to macerate my Selfe with melancholye' (quoted in Devon L. Hodges, *Renaissance Fictions of Anatomy* [Amherst, 1985], ch. 2, an invaluable study on beliefs about confusion in words, method, and matter), and Jonson, *Volpone* II.5.69-72.

[127] 'Quid me mihi detrahis?', Ovid, *Metamorphoses* 6.385; D.T. Starnes and E.W. Talbert, *Classical Myth and Legend in Renaissance Dictionaries* (Chapel Hill, 1955) pp. 194-210; Edgar Wind, *Pagan Mysteries in the Renaissance* (New Haven, 1958) ch. 11; Leonard Barkan, 'Diana and Actaeon: The myth as synthesis', *English Literary Renaissance* 10 (1980) 317-59, especially pp. 339-45 on cruel hounds as desires; Nancy Vickers, 'Diana described: Scattered woman and scattered rhyme', in E. Abel (ed.), *Writing and Sexual Difference* (Brighton, 1982) pp. 95-109; Sawday, 'The fate of Marsyas' (Note 124). See also Christopher Ricks, 'Sejanus and dismemberment', *Modern Language Notes* 76 (1961) 301-8.

[128] Phillip Stubbes, *A Perfect Pathway to Felicitie* (1610), quoted by Peter Stallybrass, 'Reading the body: *The Revenger's Tragedy* and the Jacobean theater of consumption', *Renaissance Drama* 18 (1987) 121-48, p. 124: compare Paster, *The Body Embarrassed* (Note 116).

[129] Lawrence Babb, *The Elizabethan Malady* (Michigan, 1951) pp. 17-20, quoting Vives and Wright. Babb's account (e.g. pp. 175-85) of the double movement within the mass of Renaissance thought on melancholy tallies closely with the argument of this paper: fear of the extremities and disorders of manic and mopish melancholy could coexist with fascination at the latent secrets available to melancholy genius within the Neoplatonic tradition. Compare Klibansky *et al.*, *Saturn and Melancholy* (Note 74); Bridget G. Lyons, *Voices of Melancholy* (London, 1971); Michael Macdonald, *Mystical Bedlam* (Cambridge, 1981) ch. 5; Stanley W. Jackson, *Melancholia and Depression* (New Haven, 1986) chs 5-6.

[130] The Puritan Richard Sibbs, *The Soules Conflict with Itself and Victory over Itself by Faith* (London, 1635) p. 143, quoted by Jonathan Sawday, "Mysteriously divided': Civil war, madness, and the divided self', in Healy and Sawday (eds), *Literature and the English Civil War* (Note 4) 127-43, p.135, in a paper which gathers wonderful material on this topic from a variety of moral and religious traditions.

[131] Greenblatt, *Renaissance Self-Fashioning* (Note 6) p. 9 and *passim*.

[132] John Carey, *John Donne: Life, Mind, and Art* (2nd ed., London, 1990) p. 265: also ch. 7 in general on Donne's 'passion for fusion or interpenetration'. For related themes in Donne compare Leonard Barkan, *Nature's Work of Art: The Human Body as Image of the World* (New Haven, 1975) pp. 51-60.

[133] Jonson, *Cynthia's Revels*, V.2.52-3.

[134] Robert M. Durling, *Petrarch's Lyric Poems* (Cambridge, MA, 1976) Rime XXIII, line 157, with Barkan, 'Diana and Actaeon' (Note 127) pp. 335-8, and Vickers, 'Diana Described' (Note 127), especially pp. 103-5.

[135] There are outstanding discussions of the shifting lines of individuality in Jacobean drama in Dollimore, *Radical Tragedy* (Note 4) chs 1, 10, 15, and Catherine Belsey, *The Subject of Tragedy* (London, 1985) chs 2 and 4.

[136] Scarry, 'Donne' (Note 5); there is more rich material in D.C. Allen, 'John Donne's knowledge of Renaissance medicine', *Journal of English and Germanic Philology* 42 (1943) 322-42, especially sections 4-6 on dissection, physiology, and theories of reproduction. On the ambiguous Jacobean kiss Stallybrass, 'Reading the Body' (Note 128) pp. 133-4, and also pp. 139-42 on unmasking and dissolution.

[137] Descartes to Mersenne, Nov. 20, 1629, *The Philosophical Writings of Descartes* (Note 86) vol. 3 (1991), p. 12, AT I.80, in the context of a discussion of a project for a new language: see also Slaughter, *Universal Languages* (Note 4) pp. 127-9.