

## **Automata, man-machines and embodiment: deflating or inflating Life?**

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### Abstract

Early modern automata, understood as efforts to ‘model’ life, to grasp its singular properties and/or to unveil and demystify its seeming inaccessibility and mystery, are not just fascinating liminal, boundary, hybrid, crossover or go-between objects, while they are all of those of course. They also pose a direct challenge to some of our common conceptions about mechanism and embodiment. They challenge the simplicity of the distinction between a purported ‘mechanistic’ worldpicture, its ontology and its goals, and on the other hand an attempt to understand ourselves and animals more broadly as flesh-and-blood, affective entities (that is, not just breathing and perspiring, but also desiring and ‘sanguine’ machines, as La Mettrie might have put it). In what follows I reflect on the complexity of early modern mechanism faced with the (living) body, and its mirror image, contemporary theories of embodiment. At times, embodiment theory seems to be governed by a fascination with what the Artificial Life researcher Ezequiel Di Paolo has called ‘biochauvinism’ (Di Paolo, “Extended Life”): an unquestioned belief that ‘living bodies are special’. Yet how does the theorist define this special status? The question is apparently a simple one, or at least promptly yields an aporia which appears simple: to borrow a provocative phrase from Terry Eagleton, embodiment theory is obsessed by the body but terrified of biology. Yet at the same time, at least since Hubert Dreyfus and Andy Clark’s groundbreaking works, embodiment has been a legit part of cognitive science, yielding the even more recently emerged field of ‘embodied cognition’ (see the work of Larry Shapiro), which seeks to depart from traditional cognitive science, especially the latter’s understanding of cognition as computational, in order to instead underscore “the significance of an organism’s body in how and what the organism thinks,” in Shapiro’s words.

### *Introduction*

In what follows I reflect on a conceptual pair that is not, at first sight, a piece of delightful symmetry: mechanism and embodiment. I first examine the complexity involved in early modern mechanistic approaches to organic life (contrary to some popular misconceptions), and then ask what they imply for our understanding of embodiment. Conversely, I examine in addition some of the core claims in contemporary embodiment discourse and subject it to some critical evaluation with regard to its potential anti-naturalism. What happens conceptually when we try and take account of the *reality* of actual mechanisms, but also of the *reality* of embodiment? Embodiment can be a challenge to mechanistic models, not just in a negative sense as in the usual ‘mere machines or mechanical models of life cannot grasp (*fill in your favorite feature of embodied, personal, fleshly features of life*)’, but also in a positive sense, as a kind of explanatory challenge that, I will suggest, spurs on the elasticity and ambition of the mechanistic project, as we shall see below with the ‘marveling’ at Vaucanson’s mechanical duck, but also in the irreducibly organic quality of La Mettrie’s ‘man-machine’.

To paraphrase a Deleuzo-Spinozian slogan, how much can mechanistic explanation do? If we look at the functional dimension of machines, which itself opens onto to what we might call ‘teleomechanism’ (discussed below with respect to models of organism such as the ‘animal economy’, especially in 18<sup>th</sup> century vitalism,<sup>1</sup> which are ultimately *structural*, in the sense that they study the properties of a system of interacting parts), the answer is: quite a bit. I conclude with some general reflections pointing to an ‘affective’ idea of the machine (shades of what Deleuze and Guattari, in the early 1970s, called “desiring machines”).

Some of my suggestions regarding mechanism and embodiment are not dissimilar to the more peremptory statements made by Donna Haraway in her famous “Cyborg Manifesto”:

American radical feminists . . . insist on the organic, opposing it to the technological. . . . But there are also great riches for feminists in explicitly embracing the possibilities inherent in the breakdown of clean distinctions between organism and machine and similar distinctions structuring the Western self. It is the simultaneity of breakdowns that cracks the matrices of domination and opens geometric possibilities.<sup>2</sup>

### 1.

Thirty years after Donna Haraway’s ambitious, programmatic and somewhat polyphonous “Cyborg Manifesto” – both a plea for hybridity and a kind of performative/enactive proof of its claims which points to the ‘cyborgization’ of reality everywhere around us – it may not be easy

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<sup>1</sup> Ménéuret de Chambaud, “Œconomie Animale”; Wolfe and Terada, “The animal economy.”

<sup>2</sup> Haraway, “Cyborg Manifesto,” 174. Haraway celebrates the overcoming of boundaries (animal/human, machine/organism, and of course gender boundaries.) But my concern is not with charting a new, biology-friendly course for North American feminism, although this relates to my final remarks on embodiment and its mystification (for some discussion of this debate, see Davis, “New Materialism and Feminism’s Anti-Biologism”).

to restore the habits of mind in which the machine and the body are opposed. But such habits are still firmly entrenched in embodiment discourse; in scholarship which targets, e.g., an apparently dogmatic Cartesian mechanism which treats living bodies like machines (“As a machine, the body became objectified; a focus of intense curiosity, but entirely divorced from the world of the speaking and thinking subject”<sup>3</sup>); and in many writings dealing with the theory of organism and organismic biology, which I have also worked on but which shall not be my concern here. These firmly entrenched habits reflect something of a failure to recognize or appreciate the flexibility, productivity and ‘tolerance’ (both at the ontological and at the explanatory levels) of mechanistic projects. In that sense, we need some clarification of what early modern mechanism could mean.

Major figures of mechanism in early modern medicine (or ‘iatromechanism’), such as Boerhaave and sometimes Borelli, do speak of the mathematically specifiable mechanical properties of the bodies they study as laws of nature, since these ensure that the appeal, e.g. to the functioning of a pump or a sieve to explain a heart or a liver, is backed up by further guarantees. But what is their overall mechanistic commitment? This ranges from the idea of the world as a machine (clockwork, design) to a mechanistic ontology of the particles or components that compose the physical world, to – more interestingly for present purposes – an interest in the heuristic potential of mechanism, e.g. automata (from Descartes’ fountains to ‘living machines’). This heuristic potential is of particular interest because it is both adapted to and challenged by the specific reality of embodiment – the challenge of mechanical models faced with the living body.

Early modern mechanists do not necessarily deny or neglect the specific features of embodiment. Either because, like Borelli, they reflect on the “shadowy similarity” between automata and living bodies (this is his own term: “automata have a certain shadowy sameness (*umbratilem similitudinem*) to animals in that both are organic self-moving bodies”<sup>4</sup>). Or because they seek to grasp the distinctively functional properties of bodies (as I discuss in the next two sections). From automata and man-machines to structural models of organism like the animal economy, there is a fascination with the ‘challenge of Life’. Witness this description of Vaucanson’s digesting duck by the Oxford literary scholar Joseph Spence, in 1741:

If it were only an artificial duck that could walk and swim, that would not be so extraordinary: but this duck eats, drinks, digests and sh-ts. Its motions are extremely natural; you see it eager when they are going to give him his meat, he devours it with a good deal of appetite, drinks moderately after it, rejoices when he has done, then sets his plumes in order, is quiet for a little time, and then does what makes him quite easy.<sup>5</sup>

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<sup>3</sup> Sawday, *The body emblazoned*, 29.

<sup>4</sup> Borelli, *De motu anim.*, II, prop. CXVI, 164; *On the Movement of Animals*, 319.

<sup>5</sup> Spence, *Letters from the Grand Tour*, 413-414, cit. Kang, *Sublime Dreams*, 104.

This is quite different from a picture we may have, of ‘dead mechanism’. For indeed, at least as far back as Friedrich Engels<sup>6</sup> (leading to a commonplace in 20<sup>th</sup> century Marxist discourse but also, in a kind of development that is not aware of its origins, in recent theoretical moves such as ‘new materialism’), there is an opposition between a misguided mechanistic standpoint and a better, organismic and/or humanist perspective (famously so in Sartre).

Hermann von Helmholtz, in “On the Interaction of Natural Forces,” makes a version of Engels’ classic point, appealing less to the advances of nineteenth-century biochemistry and more to thermodynamics, except his target is not the materialists of the previous century, but its automata:

To the builders of automata of the last century, men and animals appeared as clockwork which was never wound up, and created the force which they exerted out of nothing. They did not know how to establish a connexion between the nutriment consumed and the work generated. Since, however, we have learned to discern in the steam engine this origin of mechanical force, we must inquire whether something similar does not hold good with regard to men.<sup>7</sup>

Both Engels and Helmholtz are mistaken, however. I shall address their different versions of this ‘enhanced life science’ standpoint on the previous century, in turn.

## 2.

First, as regards materialism: it actually reacts quite often against the strictures of 17<sup>th</sup> century mechanism, even if core vitalist concepts such as the ‘animal economy’ are *not strictly, or wholeheartedly, anti-mechanist*. For example, Denis Diderot insists on “what a difference there is between a copper or silver watch, and a living watch,” as he put it in his late, unfinished manuscript on the ‘elements of physiology’ (*Éléments de physiologie*, DPV XVII, 335). Elsewhere in the same text, he writes that an instrument made of wood or iron cannot feel, while an instrument made of flesh can feel (**citation in final version**).

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<sup>6</sup> “The materialism of the past century was predominantly mechanistic, because at that time ... only the science of mechanics ... had reached any sort of completion.... For the materialists of the eighteenth century, man was a machine. This exclusive application of the standards of mechanics to processes of a chemical and organic nature – in which the laws of mechanics are also valid, but are pushed into the background by other, higher laws – constitutes the specific (and at that time, inevitable) limitation of classical French materialism” (Engels, *Ludwig Feuerbach*, 278). For my criticisms of this point see “The Allure of the Flesh and the Vitality of Materialism: Aporias of Embodiment.”

<sup>7</sup> Helmholtz, “On the Interaction of Natural Forces,” 36, in Kang, *Sublime Dreams*, 230-231.

But what is this difference between a copper and a living watch, or a metal clamp and flesh-and-blood hand? It is not because of some kind of innate Aristotelian teleology in the flesh which is lacking in the iron or the wood. Recall Aristotle's influential argument for why a hand separated from the body is no longer a hand: the material structure of a part *per se* matters less than 'where' it is: "Blood will not be blood, nor flesh flesh, in any and every state." A hand can only be understood as a hand inasmuch as it belongs to an ensouled body, i.e., matter animated by a form. Thus the material part, the hand, is derivative of the formal part, the soul. It is precisely this mere homonymy between a 'dead' hand and a 'live' hand which materialists miss, in Aristotle's view. If each animal and part would be defined by shape and colour, "Democritus would be right"; but "the dead man has the same conformation of shape [as a man], but nevertheless is not a man."<sup>8</sup>

Instead, the difference between copper and living watches, in Diderot, is twofold: (i) in types of arrangement and (ii) in the *type of matter itself* (including the difference between merely spatial contiguity and specifically organic continuity as Diderot presents in *Le Rêve de D'Alembert*, insisting that mere contiguity lacks 'network' properties, which a designer of neural networks might, or might not object to). The latter difference is also asserted by La Mettrie in *L'Homme-Machine*: "The body is but a watch, whose watchmaker is the new chyle"; he adds that "Nature's first care, when the chyle enters the blood, is to excite in it a kind of fever which the chemists, who dream only of retorts, must have taken for fermentation. This fever produces a greater filtration of spirits, which mechanically animate the muscles and the heart, as if they had been sent there by order of the will" (La Mettrie, *L'Homme-Machine*, 105). Very summarily, La Mettrie is playing on the most classic mechanistic analogy (the watch or clock) and infusing the clockwork with living chemistry (chyle is the vital substance in organic chemical processes).

Do these differences between a copper watch and a living watch, or between an ordinary machine and a self-organizing machine powered by chyle, amount to an *ontological difference*? In fact, early modern mechanists do not seem to insist on such an ontological difference (and nor do eighteenth-century vitalists in their focus on the organism, contrary to an equally common misconception), although an interesting passage in a 1640 letter from Descartes to Mersenne may run counter to this. Descartes himself toys with the opposition between machine and organism, or mechanical matter and living flesh, as precisely playing out at different levels: empirically (as in Helmholtz's comment on automata and bodies) and ontologically (as in Diderot's comment on flesh watches and wooden clamps, with its faint Aristotelian resonance). In Descartes' terminology, the different levels are called physical (or moral) and metaphysical: "Speaking as a metaphysician, one might well build a machine that supports itself in the air like a bird, because birds, at least according to me, *are* such machines.

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<sup>8</sup> Respectively, *Generation of Animals* I 18, 722b34; *Metaphysics* Z 11, 1036b32; *Parts of Animals* I 1, 640b29, b35.

But not speaking physically or morally, because it would take springs so subtle and overall so strong, that they could not be made by men.”<sup>9</sup>

Rather, there is an insistence on complexity, structural and functional concepts, what I’ve called elsewhere, borrowing Timothy Lenoir’s term but applying to an earlier period with a subtly inflected meaning, ‘teleomechanism’<sup>10</sup>. That is, on an explanation of systems (whether these be machines, automata or living bodies) which blend teleological features such as an appeal to purpose and function, and mechanistic features such as an account of their material properties and the interaction of their components.

As such, it is not just because later figures such as La Mettrie and Diderot seem, not just cognizant of but deeply concerned with ‘the flesh’, as Merleau-Pontyan phenomenologists might call it (relying on an opposition between *Leib*, the flesh as body possessed of subjectivity, and *Körper*, the mere physical body in space), that our historiography and our intellectual categories need improving on, especially compared with the picture painted by Engels and Helmholtz. It is also because *there is no such thing as pure, blind, cold mechanism*. And even when the body is treated mechanistically by the poster child of iatromechanism, Descartes, it is at the very least in a “systemic” sense, as Barnaby Hutchins has emphasized: “instead of reduction to corpuscular mechanics, Descartes explains the operation of the body through whole systems whose components exist at different levels (for at least some, central cases).”<sup>11</sup> Hutchins is influenced by some of the recent literature on mechanisms, e.g. Stuart Glennan:

The complex-systems approach to mechanisms does not suppose that unification derives from unity of fundamental mechanisms. According to the complex-systems approach, mechanisms are collections of parts and parts are objects, but

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<sup>9</sup> “on peut bien faire une machine qui se soutienne en l’air comme un oiseau, *metaphysice loquendo* [metaphysically speaking], car les oiseaux mêmes, au moins selon moi, sont de telles machines, mais non pas *physice* ou *moraliter loquendo* [speaking physically or morally, i.e. in practice], pour ce qu’il faudrait des ressorts si subtils, et ensemble si forts, qu’ils ne sauraient être fabriqués par des hommes” (Descartes to Mersenne, 30 August 1640, AT III, 163. Not in CSM). I consulted the translation in D. Des Chene, *Spirits and Clocks*, 110, n. 9 (thanks also to Barnaby Hutchins).

<sup>10</sup> Timothy Lenoir, “Teleology Without Regrets” and *The Strategy of Life*; Charles T. Wolfe, “Teleomechanism redux?”.

<sup>11</sup> Hutchins, “Mechanism and multilevel systems,” 671. He adds that “Descartes cannot give an account of the heartbeat without also referring to and relying on everything involved in respiration and circulation. Each plays a necessary role in explaining how the heartbeat works: in the absence of circulation or respiration, there would be no heartbeat. And each plays its role within a specific organisation: if respiration did not precede the entry of blood into the left ventricle, the blood would be ‘too rare and too fine’ for the process to continue; if circulation did not follow the active phase of the heartbeat, there would be no blood to re-enter the heart” (676); this describes a system. A systemic explanation rather than a pure mechanist-reductionist explanation, involves “the entire composition that explains the effect (rather than the behaviour of individual corpuscles), where each component is taken from the level that is explanatorily relevant for that component” (687).

the objects that are parts of mechanisms may themselves be complex structures.<sup>12</sup>

### 3.

Even pure forms of mechanism, if they exist, have a *functional* dimension, visible in the increasing focus on (a) the structure (or ‘fabric’) and purpose of the body, (b) its description in purposive terms, and (c) properly teleomechanist descriptions of “the human machine” as an integrated system of mechanisms and higher purposes, the “animal economy.” And my final point shall be that this ontology responds in ways we might not have expected to the challenge of embodiment.

Consider Richard Lower’s *Tractatus de Corde* (1669):

I must preface my account of (the movement of the blood) by some remarks on the Position and Structure of the heart. When these have been duly considered and collated, it will be easier to grasp how carefully both its Fabric and Position are adapted for movement, and how fittingly everything is arranged for the distribution of the blood to the organs of the body as a whole.<sup>13</sup>

The language of ‘position’, ‘structure’, ‘fabric’ is quite striking here. These are not notions one can derive from basic atomic properties! Of course, the more the emphasis is on a kind of interconnection (called sympathy, consensus, cohesion, etc., with often chemical specifications such as the notions of action and reaction) rather than the nature of the components, the further away we are from a componential, mechanistic ontology, in the sense of e.g. this classic statement by Descartes:

I think that all these bodies [sc. salt, sulphur, mercury and the four elements of the philosophers] are made of the same matter, and the only thing which makes a difference between them is that the tiny parts of this matter which constitute some of them do not have the same shape or arrangement as the parts which constitute others.<sup>14</sup>

Moving into the eighteenth century, we can see this in the attempts by a series of authors, including vitalist physicians associated with the Montpellier Medical Faculty but also Maupertuis, to model the structural, systemic and ‘network’ quality of the living organism (often, the human or animal body), using the language of the ‘animal economy’. Interestingly,

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<sup>12</sup> Glennan “Rethinking mechanistic explanation,” 352.

<sup>13</sup> Lower, *Tractatus de Corde*, 2.

<sup>14</sup> Letter to Newcastle, 23 November 1646, AT IV, 568.

this modeling often employed the metaphor of a bee-swarm (i.e., one organ is to the whole organism as an individual bee is to the bee-swarm).<sup>15</sup>

The more the emphasis is on interconnection, the further away we are from a componential, mechanistic ontology (more of a *relational property*<sup>16</sup>). Not necessarily because what we are seeing in the appeal to “commixture”, “mutual influence”, “action and reaction” is a *rival ontology* (i.e. organismic ontology as opposed to mechanistic ontology). But because it is *not an ontology*. Mechanism, whether in its pure or complex forms, has a functional and systemic dimension, and the more it emphasizes the latter, the more it moves away from being a pure ontology. I hope this point is clear, but we should not lose of the other key feature I have mentioned: embodiment. Because, as in my response to Engels and Helmholtz, it is not true to claim that early modern materialists (including ones who admired Vaucanson, like La Mettrie and Diderot) were blind to the reality of embodiment. And these features are more related than we might think, because analogical and otherwise heuristic appeals e.g. to automata (but also the internal rhetoric of an inventor like Vaucanson about his digesting duck) were often ways of seeking to do justice to the unique properties of organic bodies.

**4.** The relation between mechanical analogies and embodiment can also be presented as a response to a challenge, and it shows its complex relation to embodiment.<sup>17</sup> Borelli, like Descartes before him and Vaucanson after him, emphasizes that part of the significance of artificially created mechanical objects (including but not restricted to automata: it can also be a clock or a pump) is that they enable a further theoretical but more generally cognitive engagement with the properties of natural objects. The machine here is functioning as a kind of go-between, enabling the interface between ontology and heuristics, within which actual machines can serve as ‘*matière à penser*’, so to speak. In Georges Canguilhem’s elegant phrase: “Essentially, a machine is a mediation or as mechanics say, a relay (*relais*).”<sup>18</sup>

Notice how far a machine as ‘relay’ or analogy is, from the stark opposition between ‘a watch made of copper and a watch made of flesh’, in Diderot’s evocative image. The more analogical it is, the more it can serve as a heuristic: in Borelli’s words which I have quoted earlier, “automata have a certain shadowy sameness (*umbratilem similitudinem*) to animals in that both are

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<sup>15</sup> Ménuret, “Observation,” 318b-319a and “*Œconomie Animale*”; Diderot, *Rêve de D’Alembert*, DPV XVII, 121-123; Wolfe and Terada, “Animal Economy”; Sheehan and Wahrman, *Invisible Hands*.

<sup>16</sup> This portrayal of mechanism as applied to the body, as increasingly structural and relational, could perhaps be fruitfully compared to Eric Schliesser’s account of gravity as a relational property (“Without God: Gravity as a Relational Quality of Matter in Newton”; thanks to Dana Jalobeanu for this suggestion). One difference is that in the latter case, gravity is relational, it is an ontology, whereas here there is a gradual move *away* from ontology in favor of description of systems.

<sup>17</sup> I have devoted more attention to this specific issue in my “Le mécanique face au vivant.”

<sup>18</sup> “Aspects du vitalisme,” *La connaissance de la vie*, 87.

organic self-moving bodies.” Similarly, automata could be fascinating *both* because they were a form of mechanism, *and* because they called attention to the specifically ‘vital’ (teleological, purposive, intentional, homeostatic ...) properties of living beings. As Riskin put it, discussing Vaucanson’s digesting or defecating duck,

The defecating Duck and its companions commanded such attention, at such a moment, because they dramatized two contradictory claims at once: that living creatures were essentially machines and that living creatures were the antithesis of machines.<sup>19</sup>

For La Mettrie, as we have seen, our machine is very much an *organic* machine, a flesh and blood system. It is a ‘machine’ in the sense that our drives, our urges, our instincts, our hormones, our blood sugar, and as the Ancients would have said, our youth or senescence (just the sort of thing the embodiment theorist would dwell on!) don’t allow us to function in a kind of absolute freedom. This machine is not one that boils down to a foundationalist ontology of the sort we today might call physicalism...

Similarly, however much mechanist language is present in some of the vitalist accounts of the animal economy, the latter authors – the first to be clearly termed ‘vitalists’ – also stress, not mysterious vital forces, not a Stahlian soul powering the body, but a specifically (and ‘real’) *organic* structure: “They [*sc. the mechanists, CW*] did not even pay attention to the organic structure of the human body which is the source of its main properties.”<sup>20</sup>

The fear of the ‘dehumanizing’ force of the machine with regard to the warm world of the organic turns out to be misplaced, on the basis of an overview of some key texts spanning disciplines such as medicine, philosophy and, well, emerging robotics (the duck). But the embodiment theorist could respond that the real issue is not the opposition between the mechanical and the organic, but the lack of recognition of ‘selfhood’ in even these complexified, hybridized forms of mechanism: even a detailed account of “organic structure” does not seem to yield the sense that ‘someone is home’. And often, embodiment is meant to connote a sense of first-personness, as opposed to the “body-as-organism of biology,” associated with externality. Thus Karen Dale distinguishes between two ways of conceptualizing the body:

These are, first, the *historical body* – a body recognised as being constructed differently over time through social and cultural forces; and, second, the *phenomenologically lived body* – the body we experience in our everyday lives as the medium through which we ‘know’ our world. Taken together, these

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<sup>19</sup> Riskin “The Defecating Duck,” 612.

<sup>20</sup> Ménuret, “Œconomie Animale,” *Enc. XI*, 364b

approaches to the body may be distinguished from the body-as-organism of biology by using the term 'embodiment'.<sup>21</sup>

There are several possible responses here. One is to insist that early modern materialism was in fact strongly concerned with embodiment and the nature of the flesh, in contradistinction to more austere forms of mechanism (and the mind-body dualism they could include).<sup>22</sup> Another is to point to the richness of these forms of mechanism and the conspicuous fact that, e.g. when it came to projects for automata such as Vaucanson's 'defecating duck', the specific nature of organic life was the challenge, not what was denied, as I have sought to make clear above. A third is to inquire into exactly what is being defended by embodiment theorists, aside from the by now rather obvious or 'granted' fact that bodies have a history and perhaps a historicity, and a degree of self-construction as well as their "genetic" basis.<sup>23</sup> It is to this that I turn in closing.

## 5.

Consider the difference between these three claims for embodiment: (i) an American teenager and a medieval peasant, an obese person and a rail-thin chain smoker are not *in their body* in the same ways: both at the level of self-perception and of historicity. An X-Ray or an MRI scan do not access what is in each case unique and personal to the lived body; (ii) a "reluctance to conceive of cognition as computational and [an] emphasis on the significance of an organism's body in how and what the organism thinks"<sup>24</sup>; here, the idea is that the properties of an organism's body limit or constrain the concepts an organism can acquire: "An organism's body

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<sup>21</sup> Dale, "The Body and Organisation Studies," 11.

<sup>22</sup> I have tried to do this in "The Allure of the Flesh."

<sup>23</sup> An elegant statement, although perhaps so broad as to no longer be a definition, was Caroline Walker Bynum's: "There is no clear set of structures, behaviors, events, objects, experiences, words, and moments to which body currently refers. Rather, it seems to me, the term conjures up two sharply different groups of phenomena. Sometimes body, my body, or embodiedness seems to refer to limit or placement, whether biological or social. That is, it refers to natural, physical structures (such as organ systems or chromosomes), to environment or locatedness, boundary or definition, or to role (such as gender, race, class) as constraint. Sometimes-on the other hand-it seems to refer precisely to lack of limits, that is, to desire, potentiality, fertility, or sensuality/sexuality . . . or to person or identity as malleable representation or construct. Thus body can refer to the organs on which a physician operates or to the assumptions about race and gender implicit in a medical textbook, to the particular trajectory of one person's desire or to inheritance patterns and family structures" ("Why All the Fuss about the Body?", 5).

<sup>24</sup> Shapiro, "The Embodied Cognition Research Programme," 338. This approach to cognition overlaps with Malafouris & Renfrew's beautiful analyses of the 'cognitive life of things' I cannot go into here: "Our vision of the cognitive life of things is inspired more by the hybrid image of the potter skilfully engaging the clay to produce a pot, than by the linear architecture of a Turing-machine" ("The Cognitive Life of Things: Archaeology, Material Engagement and the Extended Mind," introduction to Malafouris & Renfrew, *The cognitive life of things*, 3); "Things have a cognitive life because intelligence exists primarily as an enactive relation between and among people and things, not as a within-intracranial representation" (*ibid.*, 4). For further discussion see Wheeler, "Mind, things and materiality."

in interaction with its environment replaces the need for representational processes thought to have been at the core of cognition. Thus, cognition does not depend on algorithmic processes over symbolic representations,” and “The body or world plays a constitutive rather than merely causal role in cognitive processing”<sup>25</sup>; (iii) The body is not in space like a physical object (a claim associated with ‘embodied phenomenology’). There are different ways of identifying or dividing up these claims. I shall focus on one: the extent to which they are *naturalistic*, in the sense of being compatible with the set of analyses procured at any given time by the natural sciences (bearing in mind that naturalism, for instance in Spinoza or John Dewey, can be an impressively broad doctrine).

Claim (ii), which is a summary of the research program known as ‘embodied cognition’, going back to early insights from authors such as Hubert Dreyfus and significantly expanded by Francisco Varela et al., and later Andy Clark in the 1990s until now, is fully naturalistic; it is meant to modify and/or emend work in the cognitive sciences. Claim (i) is not anti-naturalistic and is compatible with a weak naturalism, even if it focuses on dimensions of personhood or subjectivity which are not themselves accessible to scientific modelling or explanation. However, claim (iii), which is characteristic both of a radical strand of post-Husserlian phenomenology with Merleau-Ponty and of the current trend known as enactivism, rests on a fundamentally anti-naturalistic posit. The same point was made in more humoristic terms by the English cultural critic Eagleton (replace ‘postmodernism’ with ‘embodiment theory’):

Postmodernism is obsessed by the body and terrified of biology. **(full citation in final version).**<sup>26</sup>

In a way these two caricatural figures, the media executive and the Indonesian fisherman, convey two aspects of recent embodiment theory, which Eagleton has cleverly turned into a kind of contradiction. On the one hand, embodiment theory is meant to free us from the tyranny of our biology (as exemplified by the media executive); on the other hand, in its fascination with the uniqueness of the flesh and its subjectivity, embodiment theory seems to hover around the Indonesian fisherman in his ‘materiality’. But let me focus a bit more on the implicit tension between ‘biology’ and what some authors (including Dale as quoted earlier) call the ‘phenomenological lived body’ – which is, again, a tension involving the commitment to naturalism.

Theorists for whom the experience of the lived body is apart from natural science as a whole tend, perhaps unsurprisingly, to sound quite reactive. They want somehow to rescue (an entity? an intuition?), maintaining, with Merleau-Ponty, that the ‘flesh’ (as opposed to body in a merely

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<sup>25</sup> Shapiro, *Embodied Cognition*, 4.

<sup>26</sup> Eagleton, *After Theory*, 186.

spatial sense, like a brick or a glass of water) exists at least in part “outside of physical space.”<sup>27</sup> Thus the living body – indeed, any organism – “is an individual in a sense which is not that of modern physics” (*ibid.*, 154). This is anti-naturalistic, but curiously, it is a point frequently repeated in enactivist discourse, which seeks to be part of the discussion as to the nature of cognitive science. The enactivist leitmotiv is that the world of our experience is inseparably in interaction with our physiology, sensory system and the environment: focus on sensorimotor activity, life as movement; “Pigeons, for example, bob their heads up and down to recover depth information.”<sup>28</sup> But there is also a non-naturalistic commitment here. A phenomenology of the body is always a subjectivism,<sup>29</sup> for any such reflection on ‘corporeity’ treats our self-awareness as foundational. Differently put, the phenomenologist of the body cannot accept that cortical microstimulation, as has been done in experiments with macaque monkeys<sup>30</sup>, could produce a new phenomenology, a new set of memories, etc.

Lest I sound severe in judging ‘embodied phenomenology’, recall Merleau-Ponty’s sacralization of the living organism, which is, to be really specific, a metaphysics of transubstantiation, for he equates the sensation of an embodied being to a mystical communion with divine presence.<sup>31</sup>

Merleau-Ponty makes the same point without referring to the metaphysics of transubstantiation, but instead to the opposition between ‘third person’ and ‘first person’, in which of course he insists – in this more like a ‘vitalist’ than a ‘phenomenologist’ – that I am simply unable to understand the body if I think of it from an external standpoint, “therefore the body is not an object.”<sup>32</sup> Catholic metaphysics aside, we should see what is involved in claiming that the organism is not in physical space. The ontological status, the uncaused causal role of selfhood here sounds much like early 20<sup>th</sup>-century entelechies or vital forces. It plays hyper-interiority against spatiality.

Instead of safely distinguishing between types of embodiment discourse, and promoting one at the expense of the other, it may also be the case that a theoretical insistence on the fact that we are indeed creatures of the flesh means that *any form* of embodiment discourse can tend towards a mysticism of the flesh (the wisdom of the body, the body is not in space ...), an out-of-control insistence on subjectivity, first personness, and opposition between flesh and body. Yet, thinking back to my three types of embodiment claims, if (i) is less relevant to cognitive and biological discussions, and (iii) above – the phenomenological variant – is subjectivist and anti-naturalistic, a version of (ii) is most interesting, in Andy Clark’s presentation. In fact, Clark

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<sup>27</sup> Merleau-Ponty, *The Structure of Behaviour*, 209.

<sup>28</sup> Shapiro, *Embodied Cognition*, 64.

<sup>29</sup> See also the remarks on internalism and externalism in Malafouris & Renfrew, “The Cognitive Life of Things.”

<sup>30</sup> See Romo, Hernández et al., “Somatosensory discrimination based on cortical microstimulation.”

<sup>31</sup> Merleau-Ponty, *Phenomenology of Perception*, 212.

<sup>32</sup> Merleau-Ponty, *Phenomenology of Perception*, 198. I discuss this in relation to Canguilhem’s (non?-)response to Merleau-Ponty in “Was Canguilhem a biochauvinist?”

further complicates my story because he distinguishes between two arguments for embodiment, *both of which* belong to (ii) in my distinction above:

One of those strands depicts the body as special, and the fine details of a creature's embodiment as a major constraint on the nature of its mind: a kind of new-wave body-centrism. The other depicts the body as just one element in a kind of equal-partners dance between brain, body and world, with the nature of the mind fixed by the overall balance thus achieved: a kind of extended functionalism (now with an even broader canvas for multiple realizability than ever before).<sup>33</sup>

'Body-centrism' means that the theorist tends towards "biochauvinism" (Di Paolo). This is perhaps one further aporia in addition to the others we have encountered...

### *Conclusion*

If mechanistic theories of the body turned out to be less foreign to embodiment than some of the scholarship, a lot of the contemporary theory and perhaps our common intuitions would hold, conversely, embodiment theories turned out to often collapse into (or be beholden to) an anti-naturalistic mysticism of the flesh. As regards my desire to distinguish the latter theories in terms of their more or less strong, weak, or non-existent commitments to naturalism, a final observation is that naturalistic versions of embodiment theory are compatible with the expanded forms of mechanism described above. The power of mechanistic analogies is not a 'denial of the flesh'. That is, the construct known as 'mechanistic materialism' is something of a conceptual monster, for most early modern materialists were deeply concerned with what we would call embodiment – pleasure, the flesh, sensation, organic sympathies, instincts, psychosomatic interconnection, the specific nature of the brain, and so on. Embodiment theorists (and their close cousin, new materialists) often define themselves in contradistinction to "mechanistic materialists"; but in most cases, materialism need not claim that 'only matter exists'; in the elegant terms of John Sutton and Lyn Tribble, it can be "firmly pluralist" in its ontologies: "Even if all the things that exist supervene on or are realized in matter, the materialist can still ascribe full-blown reality to tables and trees and tendons and toenails and tangos and tendencies"; an account including the brain need not exclude "memories, affects, beliefs, imaginings, dreams, decisions, and the whole array of psychological phenomena of interest to literary, cultural, and historical theorists" (Sutton and Tribble, "Materialists are not merchants of vanishing"). In La Mettrie's words:

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<sup>33</sup> Clark, "Pressing the flesh," 56. Clark names Larry Shapiro, cited above, as having a 'body-centric' view. The weaker view Clark defends says we don't have to be in human bodies to have the minds we do. For an extension of Clark's viewpoint into actual "embodied robotics," building on the early robotics work of Rodney Brooks, see Symons and Calvo, "Computing with Bodies."

To be a machine, to feel, to think, to know how to distinguish good from evil, as well as blue from yellow, in a word, to be born with an intelligence and a sure moral instinct, and to be but an animal, is thus no more contradictory, than to be an ape or a parrot and to know how to give oneself pleasure.<sup>34</sup>

We are machines, to be sure, but we are necessarily organic, and furthermore, *affective* machines. To risk a curious *rapprochement*, I believe the early modern mechanist would agree with Félix Guattari, for whom,

As opposed to a thinker such as Heidegger, I do not believe that the machine is something which turns us away from being.<sup>35</sup>

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<sup>34</sup> La Mettrie, *L'Homme-Machine*, 112.

<sup>35</sup> Guattari, "On contemporary art," 50. **Full citation in final version**