

SECTION 6

Science/Technology/Virtuality



Introduction: Technology, Science and Virtuality

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The enormous subtlety and the wealth of ineffable nuances involved in human self-presentation originate in the subtlety and richness of the physical world, in low-level processes of biochemical self-organization. These utterly subject-free, but self-stabilizing processes constantly modulate the internal information flow underlying the conscious self-model. It is interesting to note how all current technological attempts at creating truly embodied artificial agents, for example, in robotics, are many orders of granularity away from the *truly* bottom-up solution Mother Nature long ago found on its way to physically realized subjectivity (Metzinger 2003, 291–292).

INTRODUCTION

In 1993 the US government installed its National Science and Technology Council (NSTC), an organ whose main aim is the regulation and coordination of policy on science and technology in the United States. The NSTC claims that a ‘revolution’ is taking place in the scientific and technological domains: based at the nanoscale, it announces, physics, chemistry, biology, materials science and engineering converge towards the same principles and tools. This view is

echoed on the other side of the Atlantic where the Netherlands Bioinformatics Centre (NBIC), characterized by its transnational approaches to science, transfers abstract knowledge developed by mathematicians into applied data, derived into many different domains. Jean Pierre Dupuy sharply observes that the ‘champions’ of the NBIC oppose fate itself. By promising immortality, they challenge the very fact that we are born (Dupuy 2000). This is, according to him, a meta-physical programme to place mankind in the position of divine maker of the world. There are apparent threats in these views, as it is evident that what they propose is more than a theoretical matter alone. There seems to be an entire programme to act upon nature and humankind implicit in these perspectives. Very much on these lines, the European Commission issued a report titled *Foresighting the New Technology Wave* (Nordmann 2004) in which it clearly distances itself from the US agenda of improving human performance, as this signals threats to culture and tradition, to human integrity and autonomy.

The different views and perspectives on the impact of an epistemological revolution

in science and technology have initiated a heated debate that will reach its watershed in the near future. Are we, as some would like to believe, merely at the moment when our conventional understandings of technology – namely situated as being opposed to organically defined categories such as life, the body and nature – are theoretically shifting, or have the interpenetration and symbiosis of technology and society, of machine and body produced more than theorizations alone, and have already reached the practical and material levels? If we consider the possible influence that instances such as the NSTC or the NBIC may exert on material reality and human life it becomes clear why it is imperative to acknowledge the new theoretical challenges and questions that are brought to the fore in these debates. The implications that accompany transformations in the understanding and practice of contemporary science and technology range from important issues concerning the notion of ethics, the role of human agency and, ultimately, the influence of discourse formation on human subjectivity, society and the human body. The discursive turn that is taking place heralds a problematic development in our understanding of human species proper. It heralds the coming-of-age of a convoluted construct: the posthuman. These issues, although pertaining to a higher realm of inquiry, nevertheless are fundamental to architecture. Subject to the same epistemological transformations, architectural knowledge and architectural discourse face a maelstrom of inner changes with the onset of digital technologies. These have revolutionized more than the working methods of architecture, including its projective powers and its design practices, and other aspects of the practical-constructive discipline of building. The technological innovations have deeply influenced contemporary architectural discourse, impregnating it with its new ‘problematique’. In recent architectural discourse, there are several strands of theorizations that have addressed this development from a diversity

of perspectives, which nevertheless remain limited in scope.

In this section we are primarily concerned with the conceptual and theoretical implications of the technological and scientific ‘revolution’ on the social, culture, subjectivity, and ultimately the human body, since it is in their mutations and hybridizations that we see the imminent danger for architectural discourse. We argue, on the one hand, that an architectural narrative that merges with science, technology and virtuality unleashes a process that may result in its ‘disembodiment’. Hence, it is crucial to propose architectural discourses that focus on a narrative exclusively as ‘a narrative of technology, science and virtuality’, and not on its artificial components. Narrative, as we will elaborate as a prelude to other important notions put forward in the chapters of this section, has the potential to resist abstraction and disembodiment. This introduction prepares and sets the groundwork of contemporary theoretical and epistemological elaborations on science, technology and virtuality, and their impact on society and the body, which the following chapters will address more concretely on architectural discourses. We believe that the formulations brought to the fore in this section ultimately should lead to the very necessary discussions and considerations of the implications that these changes will have on humans proper. Notions of ‘converging technologies’ – the improvement of human performance through human-computer convergence in nanoscale sciences – are still to be explored in architectural theory and practice.

NEW CONCEPTUAL FIELDS

A common understanding of modernity centres on the belief that human progress should be measured and evaluated solely in terms of the domination of nature, instead of focusing on the transformation of the relationships between ‘humans’ and ‘nature’.

The relationship between humans and nature, however, has without a doubt undergone dramatic changes, boundary dissolutions and definitional mutations – at least in contemporary discourse – rendering the general notions of ‘nature’ and ‘society’ obsolete. Donna Haraway, Bruno Latour and Katherine Hayles, among others, have shown in a rather convincing way how, in their obsolescence, ‘society’ and ‘nature’ are concepts that are no longer equipped to address their referents. Society and nature have undergone important transformations. Hence, it is becoming paramount to find new definitions and understandings of ‘society’ and ‘nature’.

Latour’s research in the practices of the sciences has led him to a redefinition of the concepts of nature, society and technology. His ‘sociology of science’ aims at dismantling and discharging both the concepts of nature and society. John Urry echoes Latour in his claim that a new, broader concept of ‘society’ is required, one that approximates what he refers to as ‘massively powerful empires’ roaming the globe, mass mobility of peoples and objects, and the production and circulation of dangerous human waste (Urry 2000, 13; see also Hardt and Negri 2000). Not unlike Latour, he claims that our experience is given by enduring and increasingly intimate relationships between objects and subjects, rendering the human and physical worlds as elaborately intertwined and inseparable from each other. Hence, the conventional distinctions, or separations, between society and nature or between humans and objects are no longer operative or meaningful.

What is relevant about these theories is that they manage to convey the formation of new conceptual fields. Conceptual fields evolve similarly to material culture, in part because concept and artefact engage each other in continuous feedback loops. Culture circulates through science no less than science circulates through culture. An illustrative example of this is Katherine Hayles’ reformulation of chaos theory as both the subject of scientific inquiry and the

crossroads where various paths within culture converge. In her understanding, chaos theory, like meteorology, epidemiology, irreversible thermodynamics and nonlinear dynamics, in addition to pertaining to scientific discourse, also serves the function to describe and understand complex behaviours, defeating the conventional methods of formalizing a system through mathematics. Furthermore, chaos theory may be articulated within developments in the human sciences and postmodern culture, particularly in literature (Hayles 2005). This interpretation extends to the sciences and its domains, encompassing all its subjects and objects, methods and definitions, lifting the common belief that scientists, for instance, are individuals in white robes, hermetically sealed and isolated within the laboratory, immune to the thousands of experiences that constitute the fabric of everyday life (Hayles 1991; see also Law and Mol 2002).

It is vital to see how language intersects in this. Haraway shows how the multiple languages within the territory of biomedicine concerning the immune system form elaborate icons for principal systems of symbolic and material ‘difference’ prototypical of the advanced capitalist logic of the 1980s. In this reading the immune system turns into a map drawn with the purpose of guiding recognition and misrecognition of self and other in the dialectics of Western biopolitics (Haraway 1991, 204). Thus, the immune system becomes a historically specific terrain, upon which many diverting forces and elements interact. From global and local politics, military strategic theory, to cutting-edge scientific research subject to awards and prizes; from ‘heteroglossic’ cultural productions (such as popular dietary practices, feminist science fiction, religious imagery and children’s games), to representational techniques and clinical medical practice; from venture capital investment strategies, world-changing developments in business and technology, to the deepest personal and collective experiences of embodiment, vulnerability, power and mortality, the

immune system is both an iconic mythic object in high-technology culture and a subject of research and clinical practice. Myth, laboratory and clinic are intimately interwoven (1991, 205). If, as Hayles claims, postmodernism entails a process of denaturalization occurring at multiple sites within culture, then Haraway's description of the immune system as a pastiche of multiple centres and peripheries can be nothing else than a postmodern object: symbolically, technically and politically.

In the light of what appears to be a new conceptual field characterized by its instability and mobility, by its flexibility and propensity to change, the position of architecture within it opens up interesting avenues of inquiry and interpretation. Antoine Picon, in his essay published in *Architecture and the Sciences* (2003), addressed the question of the growing number of images and metaphors from mathematics, physics and molecular biology that have spread among architectural discourse. A large number of these images are related to the growing importance of the virtual dimension in contemporary architecture, as will be elaborated further on. Picon's central question is whether this propensity in architectural discourse is a mere rhetorical figure, or 'habit', or if it is dictated by more profound motives. The use of scientific images and metaphors in architecture is not a recent phenomenon. Picon lists a series of central concepts that originated in different historical settings: the notion of 'structure', for instance, developed from biology and the study of living beings during the nineteenth century. On the other hand, science has also made use of architectural notions throughout its history. Referring to Nelson Goodman, Picon argues that architecture, like science, is about how we make and conceive worlds populated with subjects and objects, where definitions are always historically determined. Architecture and the sciences develop along parallel lines, often meeting in their common attempt to shape categories of visual perception. And in doing so, they construct the notion of subjects and society.

Not surprisingly, contemporary architectural discourse is presently developing a pattern that borrows from a typically postmodern discourse derived from biosciences. In their recent essay 'Upright or Flexible?', William Braham and Paul Emmons advance a comparable discourse within architecture: the image of health as the fortress of hygiene capable of repelling invasions of disease germs that was established in the early twentieth century has been replaced by the picture of an immune system that learns and adapts, and which is weakened or strengthened by other environmental factors. The immune system here is an analogy to a new architecture, which stands in as a microcosm of the larger ecology that it resembles. Relating to seminal texts by Mumford and Giedion, they argue that aspects of changing subjectivity may be demonstrated through building: 'If our bodies are increasingly conceived as dynamic interconnected systems, so too will our buildings be imagined and admired as flexible systems' (Braham and Emmons 2002, 292). They expound the narrative shift from 'upright', quintessentially modern designs to 'flexible', postmodern interpretations by contrasting a type of architecture that is intimately related to the human body: the gymnasium and the fitness centre.

John Russell Pope's 1932 Payne Whitney's Gymnasium built for Yale University was originally designed as an all-male school. Women were only allowed onto the first floor; the rest of the building remained exclusive for male users. Paradigmatic of an 'upright' design, the Payne Whitney Gymnasium resembles its contemporary, the Downtown Athletic Club (DAC) in New York, as interpreted by Rem Koolhaas in his *Delirious New York* (1994[1978]). Despite the fact that the former example reveals a closer interpretation of a Foucauldian cut, namely through bodily mechanics and discipline, and the latter more of notions of male pleasure, Koolhaas's interpretation of the DAC nevertheless evokes many telling parallels between these two buildings, especially as they influence the role and the shifting understandings of the human body.¹ The logic

of corporeal functions within these gymnasia and clubs – much in line with modernist ideas of hygiene – enhanced the significance of the male body, and underscored the interplay between the structure in spatial and organizational terms of the building and the transformations this produced upon the bodies of its users. Not too far-fetched then, to interpret both these structures as machines, as ‘bachelor-machines’, in which their specific constructions and designs were intimately related to the idea that these were capable of sequentially, systematically enhancing and perfecting the male body. The body is the focus for a mechanism, which processes sex-specific elements into intensities that attract, exclude or distort each other (Graafland 1996). The social division of the sexes is the breeding ground for the production of circulation, connection and exclusion, producing a quasi-autonomous architectural regime only visible in the inside of the building. According to Koolhaas, notably, the architecture of the DAC – its structure, composition and materialization – plays no role whatsoever. The only interesting or relevant aspects are its processual character, its modes of connection, its pragmatic aspects as social condenser. Literally lifting the bachelor from the ‘inferior human breed’, straightening his development and ascendancy, the Payne Whitney and the DAC also facilitate this ascendancy and thrust the bachelor into taking his first steps to becoming posthuman.

The character or attitude embodied in these examples necessarily returns us to Braham and Emmons’s formulation of the ‘upright’ versus the ‘flexible’. To explain this they use the example of the Bally Total Fitness chain of gyms that proliferated in the late 1990s. Designed as a set of recognizable components and themes, such as display windows and full-sized mirrors on the exercise floors, or as the loosely horizontal circulation of workout sequences – or circuits – the Bally Total Fitness chain embodies a contemporary ‘business practice’ characterized by its total flexibility. But it also expresses something quite peculiar about

the conceptions of the human body. If we trace the analogy between the total flexibility that lies at the heart of the concept for the Bally fitness centres, the business climate and contemporary digitalized architectures, we can observe a piecemeal disappearance of the evocations of explicit bodily concepts of the 1930s, to be replaced by the a notion of a body that immersed in a discourse of flexibility has turned into ‘disembodied computational information’.

The leap from an ‘upright architecture’, whose aim was the generation of superior bachelors – early ‘upright posthumans’ – to a ‘flexible’ architecture that produces disembodied information, is not a straightforward one. To comprehend the development into the current notion of the posthuman in architecture it is necessary to rethink and to redefine commonly accepted concepts of virtuality, technology, materiality and the human, as there seem to be interesting relationships between science and architecture implicit in this. Similarly to architecture, science is permeated by the virtual in that it is reducible neither to a set of theoretical results, nor to a collection of experimental data. Science appears as the productive tension between theory and experiment and between abstract knowledge and practice. Hence, and as will be explained in what follows, the virtual dimension operates in both architecture and the sciences.

In Chapter 28, ‘Technology, Virtuality, Materiality’, Antoine Picon will argue that the emerging contemporary subject may be suggested by the partly imaginary figure of the cyborg that presupposes a link between the human and technology so intimate that it leads to their ‘hybridization’. Crucial in this is the notion of virtuality. Not a simple notion, which has, however, been adopted into architectural discourse since the onset of digital technologies in the working environment of the discipline.² It is wise to remain within the confines of a quite specific approach to virtuality and its terminology to avoid overlapping connotations. Virtuality is intimately related to a capacity to ‘act’; it is a ‘potential’ awaiting its full actualization,

not unlike the bachelor ascending the DAC whose peak condition eventually will develop into the posthuman. Virtual reality is by no means unreal, quite the opposite; yet its full effects are latent, that is, they are not yet fully visible or evident. The virtual in this light is not far removed in discourse from architecture. Elsewhere, Picon has shown how the virtual has been key in those concepts where the notions of project and design have played a formative role. Accordingly, design, order, proportion, ornament, structure and space are all 'potencies' of architecture (Picon 2003).

In Chapter 27, 'Virtual Architecture, Digital Media', Hayles and Gannon will explain that virtuality currently has two central clusters of meaning: one deriving from virtual reality (VR) technologies, the other from the Deleuzian philosophical concept of the virtual as that which is in dynamic tension with the actual in expectancy of its actualization. Following this cluster, Hayles and Gannon also posit architecture as an emergent property of building; as the element that lends meaning to a building within an ongoing tradition. In the same way that buildings hold the promise of architecture, documents that surround buildings are equally bound to produce architecture. They have the potential of 'becoming-architecture'. Both the virtual in architecture, and the physicality of these documents, are 'real' in the Deleuzian sense.

It is not difficult to understand why architecture is not a stable construct: it appears through a series of productive tensions or potentials. Picon argues that we live in a seamless technological universe where categories borrowed from landscape theory and history might give us a better understanding of our current condition due to the gradual transitions that are characteristic, and no longer structure or system analogies. Conceptual shifts that took place during the development of cybernetics, for instance, display patterns reminiscent of material changes in artefacts. An artefact materially expresses

the concept it embodies but the process of its construction is far from passive, as Hayles and Gannon show.

Contemporary virtual reality may be traced to the Cold War period, when a new phenomenological space was emerging that could be visualized exclusively through the use of screens, maps, diagrams and probabilistic theories of prediction. This period constitutes 'the nucleus of the cybernetic movement' (Dupuy 2000, 44), when it became obvious that the central problems were related to fixing or visualizing a moving target.³ New visualizations were required and their emergence heralded the destabilization of form, an important issue in contemporary design. Until that period, architectural form was considered the ultimate result of a process of research. Its beauty was the beauty that only an end product could entail, built or unbuilt. Aided or even generated by contemporary computer technologies, digital architectural form can no longer aspire, pretend or achieve this status (Picon 2003, 303). Digital architecture remains the result of an arbitrary stop in a potentially endless process of transformation. And with this process, the human body has changed dramatically from a modernist bodily image to an informational bodiless videogram.

In architecture, many key buildings today are marked by a striking discrepancy between architectural form and tectonics. There is a distance between the initial digital presentation and the constructive reality of many buildings. According to Picon, the development of digital culture and the widespread interest for materiality pose new questions on the relationship between tectonics and the emergence and development of architecture. The tectonic dimensions of buildings as a meta-linguistic phenomenon are related to time, history and memory. But as Picon points out, it is a matter that goes beyond the question of whether we are at the end of tectonics or its rebirth. The question of its relation to memory still needs to be raised.

'THIRD NATURE', TECHNOLOGY AND SOCIETY

In the light of such intense changes in the meaning of architecture, and in line with what Timothy Luke claims, namely that we need another reasoning to capture our present world, it seems almost unavoidable to rethink not only the conceptual underpinnings of terms such as architecture and society, but also, and especially, the very relationships between them. This will revert to questions of what constitutes the categories of the real and the virtual, for instance, and underline the necessity of establishing another, new epistemic notion better suited to approximate contemporary reality. As concepts, architecture, the real and the virtual play a crucial role in the understanding of a 'third Nature', as this pertains to digitalized work processes and digital architectures and, more specifically, their relation to nature and society (Luke 1999). To better grasp the significance and urgency of Luke's formulations of a 'third Nature', it is wise to briefly summarize its preceding but always present two stages, namely 'first Nature', or 'terrestriality', and 'second Nature', or 'territoriality'. 'First Nature' gains its identity from the different terrains forming the bioscape/ecoscape/geoscape of 'terrestriality'. Earth, water and sky provide the basic elements mapped in physical geographies of the biosphere that in turn influence human life with natural forces. These geographies play a direct influence on notions of body and mind. The human brain and the rest of the body constitute an indissociable organism by mutually biochemical and neural regulatory circuits (Damasio 2005, xxi). The organism interacts with the environment as an ensemble. This is to say that the body is far more than a support system: it provides a basic topic for brain representation.

'Second Nature' finds its expression in the technoscape/socioscape of 'territoriality'. The actions of people, cities, economies, and states constitute these spaces of territoriality.

The epistemological foundations of conventional reasoning in terms of political realism are grounded in the modernist laws of 'second Nature' (Luke 1999).

In taking up the Western philosophical notions of 'first' and 'second Nature', Luke defines 'third Nature' as the informational cybersphere/telesphere, in a way similar to Picon's seamless technological universe, which he qualifies as a topography punctuated by quasi-object terminals. Here, digitalization becomes a primary concern, since it shifts human agency and structure from manufactured matter to a register of informational bits. Human presence is located in the interplay of the first two modes of nature's influence: terrestriality and territoriality. On the other hand, 'third Nature' posits itself well beyond the feasible realm of human consciousness, located more in spheres involving temporality, over and against the 'scapes' implicit in the spatiality of terrestrial and territorial models.

Both architecture and urbanism are directly involved in this new information environment as a 'third Nature' in digitalized work processes and digital architectures and in their relation to first and second Nature. An important effect of it is what Urry calls the 'collage effect': a phenomenon in which the 'event' has become more important than the 'location'.⁴ Urry's formulation departs from a critique against media, and centres on the argument that the juxtaposition of stories reveals that most of them share nothing in common except for their newsworthy character (Urry 2000, 127). Urry's 'collage effect' can be made operative in architecture, where the effect of digital media quite literally effaces the notions of space and place, dissolving them into neutral data of locations while simultaneously reducing all forms of embodiment to digital data and event. Arguably, 'telemetricity' has replaced the older aesthetic parameters and the notions of beauty and the sublime in architecture. The growing volatility and ephemerality implicit in telemetricity have supplanted

the unique building (as concept) transforming it into a 'series'. This series of possible solutions in rapid prototyping is necessarily the product of an arbitrary stop in the process. But it is the 'final' design that is the end of the prototyping process. This brings to the fore the notion of meaning. As an event, architectural form is supposed to find its ultimate justification in what it can achieve. In referring to Lars Spuybroek's D-Tower, Picon argues that the tower in itself is meaningless. What it does is merely to perform: it has neither meaning nor function.

An interesting association might also be established between Luke's 'third Nature' as informational 'spheres' (as opposed to 'scapes') and John Urry's conception of 'instantaneous time' (2000, 126). Instantaneous time is related to the new informational and communicational technologies based on inconceivably brief instants beyond human consciousness. Codes can be sent over fibre optics instantaneously. There is no longer a shared, stable context that helps to anchor meaning and guide information (Hayles 1999, 47). In contrast to the fixity of print, decoding implies that there are no original texts, no first editions or fair copies. Something similar seems to be occurring in contemporary architectural design, where physicality and body are currently also data or codes to be translated into computer programs. The very notion of 'embodiment' and 'urbanity' in first and second Nature as social construct, as a set of complex social and biochemical relations, is fading away in recent digital design due to the seemingly endless possibilities of digital design techniques.

What seems to be needed then is a new form of 'seeing'. Hayles advances the adoption of a double vision that focuses simultaneously at the power of simulation and at the materialities that produce it, a perspective that corresponds in a certain way to Pestic's notion of 'seeing double' (Pestic 2003). In this, one way of thinking about materialities is through functionality, which according to Hayles may be exemplified with rather inconspicuous applications, such as data

gloves or voice activated commands, as the well-known Blur Building of Diller + Scofidio shows. Despite being a clear spatial example, it is nevertheless dependent on computer sensors to locate a given body position. In that sense, it is purely instrumental, and not comparable to social, sensory or political notions of space and urbanity as advocated by Henri Lefebvre or David Harvey.

Arguably the contemporary 'right to the city' might be partially fought out over the web, but political force will need embodiment deployed on the ground, on the streets, rather than on digital highways. Information, like humanity, cannot exist apart from the embodiment that brings it into being as a material entity in the world (Hayles 1999, 49). Embodiment is always instantiated, local, and specific (1999, 196–197). And as such, it encompasses a broad spectrum of problematic relationships and forces that have to converge at some point in order to form coherent directionalities for action. As Harvey points out, there is a witches' brew of political and environmental arguments, concepts and difficulties surrounding these questions that can conveniently become the basis for an endless academic, intellectual, theoretical or philosophical debate (Harvey 2000, 215). No satisfactory solutions will be reached from this debate unless adequate ways of translation between different languages or, even more ideally, some sort of common language is found. This would also entail the establishment of a 'common ground' as Lash advocates. David Harvey refers to 'the web of life' metaphor, something that might indeed be useful in filtering our actions through the web of interconnections that form the living world. This idea, at least in its intentions, comes close to Latour's notions of 'actant-network-theory', or ANT. Harvey, however, operates on a Marxist level, not comparable in any way to Latour's sociology.

The loss of urbanity and body, as well as the fading of social, biochemical and neural regulatory circuits as parameters for

Insert Name:
Scott Lash

architecture and urbanism, is of course of no small significance. It brings questions of action and agency to the fore: how are we to understand our own actions in relation to our organism, nature and society? And how could this translate into possible architectural and urban solutions?

Architecture and urbanism directly deal with the consequences of the shift to our present information age, or post-industrial society. The great advantages promised by these models have necessarily been accompanied by dire problems in most of the larger Western cities, both in Europe and the United States. Contradiction and conflict are the by-products of increased freedom in both choice and mobility; and the connection between the increase in crime and social disorder to the information age is too obvious to disregard. With the arrival and consolidation of the so-called 'new technologies' in the spatial disciplines – architecture and urbanism in particular – we too will have to consider what Fukuyama refers to as the 'great disruption', or the negative trends in society intimately associated with the transition into the information society (Fukuyama, 1999).

The great disruption produced in the transit to a new form of society given entirely to the coding and decoding of information evidences the urgent need to analyse more than the informational techniques alone, but also the effects that these produce on contemporary society. Beyond the concerns of how this disruption may speed up the decline of Western societies, or even of how it has determined the tendency to restore norms, as Fukuyama claims, the transition to an informational society renders the very concept of 'society' as problematic for architectural theory. Questions on whether it is feasible – or even necessary – to devise a whole new theory for contemporary architecture are unavoidable today. To be able to rethink architectural theory, however, we need to be willing to rethink the very concepts of technology, science, economy and society itself. On the other hand, notions of

action and agency require a reevaluation in order to arrive at a different conception of how society, technology and science are interrelated.

In this, the concept of 'action' in relation to Luke's three Natures is key, in spite of its inherent complications. 'Action' should not be understood as an 'act' under the full control of consciousness, but rather as a node, a knot or a conglomerate of many unexpected sets of agencies that have to slowly be disentangled (Latour 2005, 44). Some of the complications of this model are evidenced in the difficulty, if not impossibility, to determine where these systems begin or end, where in these complex systems solutions to environmental and ecological problems may be found, and what kind of agreements will be possible to ameliorate architectural and urban problems. But perhaps most importantly, this demands a complete rethinking of the meaning of agency. The ideas that agency, desire and will belong to the self, and that 'self-will' is clearly and unambiguously distinguished from the will of others, have to be relinquished. In the dissolution of agency as determined by 'self-will', in fact in the redefinition of freedom, we see the posthuman emerge in discourse.

The posthuman is in this regard not necessarily or completely unfree: 'there is no a priori way to identify a self-will that can be clearly distinguished from an other-will' (Hayles 1999, 4). Extending this to society as a whole may also be possible. Collaboration and cooperation in everyday life may be misleading on the level of society since, as Harvey claims, the socio-biological argument that cooperation is, in a sense, an adaptive form of competition also applies to society at large. The apparently dichotomous characteristics of individualism versus collectivism are in fact intimately linked to one another in clearly evolutionary terms. The difficulty in this it that individualism and collectivism render the competitive moment also as the shaping instance of everything else, and use adaptation to absorb

collaboration within a competitive framework (in biology) (Harvey 1996, 190). A similar idea is advocated in Fukuyama's work as well. Quoting Richard Alexander, he claims that 'human beings cooperate to compete' (Fukuyama 1999, 175). The origins of cooperation start with kinship; altruism exists in proportion to the degree of relatedness (1999, 169). Culture itself, as the ability to transmit behavioural rules across generations in a non-genetic way, is hardwired into the human brain, and constitutes a major source of evolutionary advantage for the human species (1999, 158).

All the same, it is impossible to conceive of a convincing individualization without establishing some sort of community as ground first. No ontology is even remotely possible without a ground, without the ground of praxis as 'situated intersubjectivity' (Lash 1999). In that sense, culture and social praxis exert an important influence on the 'groundedness' of community, as is the case with very small groups, and to a greater extent also in specific regions where religion plays a crucial role (Fukuyama 1995).

But larger groups require norms and social rules to function. Harvey considers competition, adaptation, collaboration and cooperation, as well as environmental transformations, as relational social categories rather than mutually exclusive ones. As relational figures, these categories are able to retain their relative autonomy. In the social world, the human capacity of 'self-realization' is socially and economically related to values and to intersubjectivity. The distinction occurs on the level where norms and social capital interact, and especially in the ways that these survive under contemporary capitalist rules. Harvey regards the effects as negative, of course, while Fukuyama, on the other hand, depicts capitalism as capable of creating new norms, breaking apart traditional loyalties, generating new ones and, more generally, creating order. That this 'net creator' of norms is also a moralizing force in society comes as no surprise.

So far, the importance of subjectivity has been traced in its collective aspects to 'intersubjectivity'. There is, however, another issue in this that should not be left unaddressed. The cybernetic aspect of the posthuman that we began to sketch earlier is not necessarily related to interventions or alterations to the human body. As Hayles argues, even biologically unaltered homo sapiens will count as posthuman. Arguably, the posthuman is all about the construction of subjectivity, or 'human self-presentation' (Metzinger 2003, 292). And in that sense, the posthuman becomes paramount to the disentanglement of one of the main concerns of this text, namely in the posing – or rather proposing – of architectural discourse as a narrative about technology, science and virtuality, and not about its artificial components.

The recourse to memory taps heavily into the very potencies of narrative itself, particularly in its resistance to various forms of abstraction and disembodiment. Narrative as a second order reflection or meta-linguistic phenomenon permits a more embodied form of discourse than any form of analytically driven systems theory as it is conventionally used in contemporary digital architecture. This issue is crucial. What seems to be occurring to contemporary architectural discourse as a narrative about science, technology and virtuality is in fact a process that may result in its disembodiment. Secondly, the discourse on and around the meaning of the 'social' – in the sense of memory and history in the contemporary world – poses new questions for architecture as a built, non-human object.

THE [SOCIAL] BODY AND THE NARRATIVE OF THE SENSES

In order to concretize the role of the body, Urry develops a more detailed examination of the sensuous constitution and a renewed exploration of human sensuous practices,

more in line with Marx's critique of the *First Thesis on Feuerbach* (Urry 2000, 78ff.). He also relates to how some of the most extraordinary insights of the natural sciences during the twentieth century were incorporated into the social sciences and the humanities, often to their detriment. In *Justice, Nature and the Geography of Difference* (1996), David Harvey addresses similar questions.

Hayles' work on cybernetics is especially informative. According to her, the first wave of cybernetics unleashed by Norbert Wiener held a complex and uncomfortable relation to the liberal subject. Wiener was committed to creating a cybernetics that would preserve autonomy and individuality (Hayles 1999, 140). The second wave of cybernetics, as endorsed by Humberto Maturana, follows the liberal tradition of cybernetics, like Wiener, in that it values the autonomous individual rather highly. But it regards the perception of the observer as determining in the construction of reality rather than in its passive perception. This construction depends largely on positionality and not on personality. If the world is tied to the observer, it becomes urgent to ask how to maintain boundaries intact and to what purpose, while maintaining connection to a world which robustly continues to exist regardless of our thoughts about it (1999, 147). Einstein already showed that there is no absolute time independent of the system it refers to. Time and space are not separate from each other. Relatively little social science, however, has incorporated these materials into theory or research (Urry 2000, 121). Urry shows how the social sciences have employed incorrect models of how time is conceived within the natural sciences as a way of arguing for a 'reconfigured sociology' capable of overcoming the division between the physical and social worlds. In this respect, Urry's discourse on the senses is of special significance for architectural discourse. In it he deals with the primacy, or 'hegemony', of the visual over other

senses, a hegemony that is also predominant in current architectural discourse and digital practices. According to him, reconfigured sociology should be able to mobilize powerful theory and trigger relevant, solid research in a 'post-societal', 'post-gardening epoch'. It should be a sociology more appropriate to 'game keeping' than to 'gardening', mainly because game keeping is inherently tied to flux, to rapidly changing patterns of habitation and transport, and so on; in short, a sociology appropriate to flexible accumulation. And this is precisely the underlying concept of the Bally Total Fitness chains, where real flexibility lies in the interchangeability of its stores or branches. Failing stores can be closed for the greater good of the chain; new ones can be opened on new sites.

But beyond these examples of flexibility, there is a more serious problem accompanying the arrival and rapid development of so-called new digital technologies into architectural practice. The conceptualization of and the relation to Luke's 'first Nature' and 'second Nature' has either been lost completely or dealt with in a rather superficial method of data collection. The main discussion here is about the conceptual reduction of first, second and third Nature into one abstract, autonomous data based concept. This reduction is often embodied in the pseudo-architectural concepts or insubstantial datascares used by Dutch architectural practices such as MVRDV, UN Studio, NOX and ONL. This is indeed related to 'the idealization of architecture as autonomous form' (Braham and Emmons 2002, 302), namely the efforts of the profession to define and protect some independent class of work. Digital architectures, as the Eleventh International Architecture Exhibition in Venice (2008) showed, are indeed 'Out There'. They have moved beyond any notion of first and second Nature. Architecture has become an object of desire, no different from Damien Hirst's art forms. 'Context', that contested concept in sociology, is not

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a field of influence as many contemporary architectural studios might see it, but instead should be a key element in our efforts to formulate an urban and architectural theory in a post-societal condition.

The question of how to construct a slower, more stable, less volatile and more grounded theory capable of dealing with our senses forcefully leads to addressing eligible terms in a revisited description and analysis of the very relationship between ‘man and nature’. If contemporary biology is about recognition and misrecognition, of coding errors, of the body’s reading practices, and of multi-million dollar projects to sequence the human genome, as Haraway suggests, it is then imperative to find and devise what Hayles and Gannon see as ‘narratives and concepts’ that might work for contemporary ideas in architecture and urban society.

In biomedicine, these narrative transformations translate into a body that ceases to be a stable spatial map of normalized functions. Instead, it emerges as a highly mobile and unstable field of strategic differences. The body in architectural digital design techniques and image reproduction resembles this concept. It seems futile to oppose the slow ‘ecological’ body equipped with senses to a volatile diagrammatic figure rendered in computational techniques in architecture, by simply ‘replacing’ its sensory functions. Both figures might rely on impermeable boundaries, which still leave the simple form of rationalist models of cognition intact, as Haraway shows. Here, Winograd and Flores’ critique of the rationalist paradigm of embodied – or ‘structure determined’ – perceptual and linguistic systems and, significantly, of computer design is useful (Winograd and Flores 1986). They argue that the existence of an objective reality composed of things bearing properties and engaging in constant relationships is simply taken for granted in many of these models. A cognitive being gathers information about things, building a mental model with little regard to its phenomenal reality, which can easily become the main concern of the scientist,

or the architect for that matter. Knowledge in that sense becomes a storehouse of (architectural) representations that may be called upon to reason and that may be translated into language or design. Thinking in that way is a process of manipulating those same representations into language or form: Italian rationalism created architecture from abstracted visual phenomenal reality, while advanced digital design creates from software possibilities, simultaneously abstracting from the complexities of what we tend to call ‘social reality’. If we are to take the relation between physics, the body and the social seriously, then the status of the model will change.⁶

A significant amount of architectural thinking is still advancing along these storehouse lines, with the result that (aesthetic) experience transmits on a permeable level of subjective experience. This does not only imply that one theoretical term is ‘better’ than another, as for instance Haraway illustrates in her listing of two historical moments in biomedical production of bodies from the late nineteenth century to the 1980s, but also that many terms or concepts in science and technology are less innocent than they seem initially. Language is never a true follower of intention. Hayles argues that there is an impressive body of work exploring how metaphors, narrative patterns, rhetorical structures, syntax and semantic fields affect scientific discourses and thought.⁷ Human history can be read from language, since it gives individuals the opportunity to push back frontiers. It is never a passive instrument; it is an active engagement with a vital medium that has its own currents, resistances, subversions, enablings, pathways and blockages. But in this there are dangers. The body, for instance, might get entangled in a disembodied web of codes and abstractions that cause injury to its sensory and emotional capacities (Graafland 2000, 95). This makes the study of how rational choices are pervaded by emotions more important than ever before. In this regard, a reference to the work of neurophysiologist Antonio Damasio is

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revealing. His study focuses on patients with brain damage (specifically to the ventromedial part of the prefrontal cortex) and demonstrates how these patients can talk rationally about their effects on other people while remaining totally disconnected from them (Damasio 2005, 209). The brain creates numerous somatic markers: feelings of emotional attraction or repulsion that help the brain to calculate by short-circuiting many of the possible choices that lie before it (2005, 173; see also Fukuyama 1999, 183). But when a thought process reaches a somatic marker it stops calculating and makes the decision. Our brain uses somatic markers for rational decision-making.⁸ Norms and intersubjectivity have an extremely powerful emotional hold on humans. Individuals who calculate their self-interest with absolutely cool rationality are considered abnormal and even psychopaths (Damasio 2005, 178). In other words, in our daily life the process of rational choice is pervaded by the emotions, and then not only as a source of preferences.

The theorization of human subjectivity and bodily experience in the computer age has yet to begin in architectural discourse. The desire to imitate and extend the calculating and intellectual faculties of the mind has always been present. Despite the fact that the wilder fantasies of the past have been dispersed, today it is still much more feasible to construct machines that are capable of high intellectual performance than to find an automaton capable of expressing ordinary, tangible corporeal sensations like hunger, sorrow or fear in any real way. Hence, our scepticism towards the successors of cybernetics such as Artificial Life (AL) and Artificial Intelligence (AI) in which consciousness is considered the 'late comer' in evolution. Without wishing to discuss this last item at length at this point, what seems dubious is the possibility for us to generate a world in which 'humans and intelligent machines can both feel at home' (Hayles 1999, 239). The computational universe that spreads out before us today might quite literally be nothing more than a 'cybernetic

dream' (1999, 239). Enmeshed in lethargy or slumber, our attention might be distracted from the real problems and concerns of our contemporary world. Hayles stresses something similar: the computational universe turns dangerous when it stops being a useful heuristic device and transforms into an ideology that privileges information over everything else as in many digital architectures (1999, 244). Furthermore, information is a socially constructed concept; it is nonsensical to think that just because information has lost its body, humans and the world have lost theirs too. Elaine Scarry's research on language and torture, as will be explained further on, is an illuminating example of the opposite. The penetration of literary criticism into the theories of architecture in the 1980s in deconstructivism, as in Eisenman and Derrida, even notions of 'criticality' and 'autonomy' of a Marxist signature as in Michael Hays and 'post-criticality' with a 'project oriented' signature as in Speaks, Somol and Whiting, all have notoriously neglected the role of bodily argument.

Hayles argues that feelings constitute a window through which the mind looks into the body. If, as she writes, 'feelings and emotions are the body murmuring to the mind', then feelings are 'just as cognitive as other precepts' (1999, 245; see also Damasio 2005, 159). Along these same lines, we find Beaufort's reference to Cohen's book on human robots illuminating: '... we cannot now foresee how a future computer could be programmed to blush in suitable embarrassing circumstances, since blushing seems a singularly human phenomenon when we feel exposed' (Beaufort 1989, 469). It is, for instance, inconceivable to think or imagine a future robot committing suicide, since suicide implies a foreknowledge of death and some idea of its significance. This is a privilege of human beings (1989, 470).

It may be worthwhile to return to Urry's discourse on the senses. But in order to formulate this it is necessary to conceive of a more developed theory and history of sensuousness. On the one hand, this form

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of theory is bound to a notion of parataxis and its accompanying structure in theory and criticism. On the other hand, it calls out for a critique on what Hayles refers to as the 'postmodern orthodoxy', which considers the body as a primarily, if not entirely, linguistic and discursive construction, resting on the belief that its materiality is secondary to the logical or semiotic structure it encodes (Hayles 1999, 192). Following on this, Dupuy constructs a relation between French structuralism and cybernetics; both search for subjectless cognition: cognition without mental content. The unconscious henceforth could be identified with a cybernetic automaton. 'The alliance of psychoanalysis and cybernetics was neither anecdotal nor fortuitous: it corresponded to a radicalization of the critique of metaphysical humanism' (Dupuy 2000, 19). Despite the fact that **Althusser** indeed developed a 'cybernetic' attitude to a subjectless social structure, namely ideology functioning like a 'cybernetic automaton' (2000, 19), his philosophy places materiality as secondary to the logical structure it encodes. Althusser's epistemological *coupure*, which he constructs out of Marx's early and later writings, is in line with Dupuy's encounter between cybernetics and structuralism. Eileen Scarry refers to this phenomenon by highlighting the discrepancy in the tone of Marx's writing when he acknowledges the body's presence in the elementary sites of artifice, such as raw materials, tools and material objects. The tone becomes more political in more sophisticated sites such as money, capital, the circulation of capital, etc. When Marx moves beyond what she calls 'cellular self renewal' to more compelling forms of self artifice like language, material objects, moral and political consciousness, it continues to be the actual living body itself that is altered (Scarry 1985, 252). It is this notion of body alteration that disappears into Althusser's transformation of ideology as the 'science of man'.⁹ What is lost is Damasio's discovery that the body provides a ground reference for the mind (Damasio 2005, 223).

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If we were to re-establish an analogy with the sublime in architecture theory, away from the autonomous data based concepts of digital architectures – to bring back Picon's 'potencies' of architecture – then Scarry's investigations might be of enormous assistance. In them we find a notion of the sublime that can no longer be considered as a Kantian aesthetic experience in which fear and terror are vanquished by the ethical. Scarry's sublime is informed by her studies on the documental compilation of Amnesty International in relation to torture. Her sublime literally encompasses the speechless and irrational terror that emanates from bodily torture. The 'murmuring' of the body is here literally obliterated. Instead, physical pain gains a special status over the mental, the somatic, as well as other forms of perceptual phenomena. Pain is the only sensation that can never be answered or experienced outside of our selves. No external object can ever relate to physical pain in the same way as the body – our body – does. And despite the fact that the experience of physical pain pertains to other human sensorial registers such as desire, hunger, touch, sight and hearing, it differs from all other physical and mental **sensation** because it has no object beyond or outside our bodies. The lack of an object, and hence the absence of a referential context, makes it almost impossible to express pain in language. This, we believe, overruns the contents of Metzinger's 'self-model of the body'. Humans are subject to an integrated 'mélange of bodily sensations', which encompass '... a host of different types of self-presentational content, like visceral sensations; feelings of hunger, pain, or thirst; proprioceptive and kinaesthetic formats; tactile and temperature sensations; and vestibular information, which are continuously integrated into a supramodal, conscious body image' (Metzinger 2003, 301). We are never in contact with our own body. As an embodied, conscious entity, we are the contents of an image. But this image is a dynamic image in constant flux. Phenomenal experience of immediacy is a

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graded feature. Thoughts are something that may not even be determined in their full content before being spoken out loud, or actually written down, whereas bodily sensations like pain or thirst are directly given as explicit and 'ready made' elements of the phenomenal self in a much stronger sense.

But beyond 'normal' life, it becomes evident that the conditions of torture that Scarry describes leave little room for Metzinger's integration or 'mélange' of bodily sensations. The supramodal body image shrinks and dissolves into a dominating, speechless experience. Physical pain is not only resistant to language, but it also actively destroys language, deconstructing it into a 'pre-language' of cries and groans (Scarry 1985, 172). To hear those cries is also to witness the shattering of language; it heralds the total disintegration of Metzinger's conscious experience of 'mineness'. Pain and imagination are each other's missing intentional antithesis. They are more than mere opposites. Pain and imagination are above all mutually exclusive: the existence of one requires the elimination of the other. Together, however, they generate the framework of our identities as creative beings, and within them all other intimate perceptual, mental, emotional and somatic sensations. In this way Scarry opens a direction that might lead to Damasio's two-way bridge between neurology and humanities, and to find out what the brain does during aesthetic experiences (Damasio 2005, xiv). Revealingly, in many languages the term that comes closest to 'pain' is 'work'. As such, 'work' and 'pain' refer to a 'created' object, something that associates it not only with physical pain but also with pleasure, art, architecture, imagination and civilization; in short, to all that which expresses the creative power of man.

CONCLUSIONS

If, after surveying the implications of our new technologies and the computational and

informational universes they unlock on our bodies, on our material realities and on our cognitive spheres, we were to reach any form of concluding remarks, we would be forced to phrase these as a sort of warning. Digital technologies and computerization are changing the very notion of 'tool' or 'technology', as Grosz and Hayles tirelessly remind us, and therefore require a certain degree of precaution. Architectural design will only become more reliant and dependent on these new digital technologies, and this will have as a result that our understandings of technology, nature and body will necessarily have to shift to adapt to them.

Contemporary discourses on dematerialization will inevitably change our conceptions of both the body as a material substrate and the 'message'. Information technologies create 'flickering signifiers' – a term that Hayles relates to Lacan's 'floating signifiers',¹⁰ which are characterized by their tendency toward unexpected metamorphoses, attenuations and dispersions (Hayles 1999, 29–30). This, however, does not imply that computational or digital virtual reality is fundamentally different from the virtual reality of writing, drawing or even thinking. The virtual is simultaneously the space of the new, the unthought and the unrealized. And it is precisely here that the real challenge for architecture begins: the 'new' in architecture is certainly not limited to digital techniques as the term in 'digital architecture' suggests, just as the cybernetic aspect of the posthuman is not necessarily related to interventions or alterations to the human body. In architecture, the virtual is present in all its forms, from its processes to its practices, from its concepts and projects to its expressions and representations. The virtual is an integral part of architecture. Nevertheless, and in spite of the fact that these are rarely acknowledged in contemporary architectural theory, there are real and important limitations to this: the capacity of simulations to approach the sensory and the corporeal is still impossible today. If we consider that these corporeal limits and sensory capacities

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have always been, and continue to be, a vital engine for architecture, it seems far too easy and unjustified to simply ignore them in order to advocate a 'new', digitalized architecture more in tune with other logics than that of our own 'slow' but socially constructed and physically subject free realized materiality.

To confine architecture to its technologies is to reduce its practice and theorization to a simplified discourse that can only address self-reflexive subjects, bodiless holograms and empty simulations. To the best of our knowledge, this is – if not entirely wrong – nonsense. Discourses that attempt to de-materialize their subject matters are bound to fail in their inability to address the complexities of materialities and bodies: two essential elements of architecture at large. For contemporary architecture, and especially for architectural theory, dematerialization is, if anything, partial, reductive or limited. If architectural theory is at a cross-road, where revisions and redirections are required for its sustained development, it forcefully needs to take the limited scope and application of contemporary discourse into account and be prepared to fully engage the complexities of our present reality.

NOTES

1 A description of the DAC is revealing: its thirty-eight floors were linked to a node of thirteen lifts located on the northern side of the building. The verticality produced by thirty-eight floors allowed people to think of the DAC as a hierarchically arranged set of levels or logics. So the lowest floors were also where the most conventional exercises took place: squash courts, a handball alley, billiard tables, etc. These facilities enabled a rather simple task, namely that of keeping the body fit. The subsequent levels equal the stages in the transformational process of the body: the more intense the workout, the better trained the body and the better trained the body, the higher the athlete ascended within the building. Following this logic it is on the higher levels or floors that a more special territory is revealed, not dedicated to physical exercise alone. On the ninth floor, which significantly housed the Oyster Bar, the

athlete undressed and put on his boxing gloves. The plot for this floor then becomes '... eating oysters naked with boxing gloves on' (Koolhaas 1994, 152). A level higher, additional elements are added to this 'social condenser', namely the preventive-medical facilities, a massage section, Turkish baths, sunlamps and six barbers, who 'are initiated into the mysteries of male beauty' (1994, 155). The medical centre, the 'image of health as a fortress of hygiene', is where the process of 'colonic irrigation' unfolds, from where the healthy and purified body is ready to ascend to the top-level sports, to finally link up with the female (element) and the recuperation of the bachelor's body.

2 Deleuze's ideas on the virtual have had a substantial influence on contemporary architectural and art discourse. From Bernard Cache's *Earth Moves* (1995) on through John Rajchman's *Constructions* (1998), Greg Lynn's *Animate Form* (1999), Sanford Kwinter's *Architectures of Time* (2002), Brian Massumi's *Parables for the Virtual* (2002) and Elizabeth Grosz's *Chaos, Territory, Art* (2008) the influence of Deleuze's conceptions of the virtual have played a central role in recent designs of so-called 'folded architectures': a trend that has become prevalent in many architecture schools today (Kittlausz 2005).

3 Norbert Wiener and Julian Bigelow had been working on the theoretical problems posed by anti-aircraft defence. The central problem was that the target was mobile. It was necessary to predict its future position on the basis of partial information about its prior trajectory (Dupuy 2000, 44). The phenomena ranged over a vast amount of possibilities: the attack of bombers and enemy armies, the state of military supplies, or economic trends, regardless of whether real or hypothetical (Picon 2003, 293).

4 The notion of event can easily lead to misinterpretation. Eisenman states that mediated environments challenge the givens of classical time, the time of experience. Referring to the Rebstock Park project in Frankfurt, he argues that architecture can no longer be bound by the static conditions of space and place; it must deal with new conditions such as the 'event'. Rebstock is seen as 'un-unfolding event', comparable to a rock concert where one becomes part of the environment (Eisenman and Rajchman 1991, 9). This is a peculiar reading of Deleuze's *The Logic of Sense* (1990), where he formulates the notion of event as a field of virtual structures. Events are not bodies, but 'incorporeal entities'. They are not physical qualities and properties, but rather logical or dialectical attributes. Events belong to the virtual field, they are 'ideal by nature', and should not be confused with their 'spatio-temporal realizations in states of affairs' (Deleuze 1990, 53). Statements about events

are fundamentally different from statements about physical qualities and properties. Events are not what occurs, but are rather inside what occurs.

5 In the early 1950s the neuropsychiatrist Warren McCulloch defended an ontological position of the model, distancing himself at the time from John von Neumann. A model, for McCulloch, was not a simple instrument of calculation having a purely pragmatic value, determined by the answer to the question 'Does it work?' It had an ontological reality. Cybernetics was concerned with mechanizing the human. It regarded physics not as the rival needing to be challenged – it regarded physics as supplying the model needing to be imitated (Dupuy 2000, 51).

6 Katherine Hayles lists prominent examples: Gillian Beer's *Darwin's Plots*, Donald McCloskey's *The Rhetoric of Economics*, Michael Arbib and Mary Hesse's *The Construction of Reality*, Charles Bazerman's *Shaping Written Knowledge*, and Bruno Latour's *Science in Action* (Hayles 1991, 5).

7 The prefrontal cortices receive signals from several bioregulatory sectors of the human brain and are part and parcel of the reasoning and decision-making apparatus. In that way they are in a privileged position among other brain systems. Somatic markers are created in our brain during the process of education and socialization by connecting specific classes of stimuli with specific classes of somatic markers.

8 See also Metzinger (2003, 82) and Damasio (2005).

9 In Althusser, knowledge is related to sensory knowledge originating from our body in contact with other bodies and our world and related to the way we live our lives. He stresses the deforming ideological side of it, but he hardly addressed the affective issue. Contemporary neuroscience (as in Damasio) shows that feelings are as cognitive as any other perceptual images. They are first and foremost about the body (Damasio 2005, 159).

10 Hayles relates the notion of 'flickering signifiers' to Lacan's 'floating signifiers', in which he stated that 'signifiers are defined by networks of relational differences between themselves rather than by their relation to signifieds' and further that 'signifieds do not exist in themselves, except insofar as they are produced by signifiers'. In other words, they constitute an ungraspable flow 'floating beneath a network of signifiers that itself is constituted through continual slippages and displacements'. A 'flickering signifier' is characterized by a foregrounding pattern and randomness typical of information technologies. Hayles suggests that the signifier cannot be understood as a single marker on a page in a traditional sense but rather as a flexible chain of markers bound together by the arbitrary relations specified by the

relevant codes. This explains the interchangeability and arbitrariness between signifier and signified in coding chains, which also account for the difference that 'the intermixture of randomness' produces on patterns (Hayles, *Virtual Bodies and Flickering Signifiers*, available online: www.english.ucla.edu/faculty/hayles/Flick.html – accessed February 23, 2009).