Virtual Matter in Bioinformatic Capitalism

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> „When the atoms are travelling straight down through empty space by their own weight, at quite indeterminate times and places they swerve ever so little from their course, just so much that you can call it a change of direction. If it were not for this swerve, everything would fall downwards like raindrops through the abyss of space. No collision would take place and no impact of atom upon atom would be created. Thus nature would never have created anything." (Lucretius, On the Nature of the Universe, Book II, 220: 43)

Introduction

The contemporary pervasiveness of new sciences and technologies of communication and reproduction (from cybernetics to genetic engineering) has been at the core of recent debates about the relation between information and materiality, the machine and the body. In cybernetic culture, it has been argued, nature has become integrated in the nexus of information transmission, a mediated cyberspace in which the body is incorporated in the technological machine of binary codes. In the cultural analysis of new information sciences and technologies, the warning against the ultimate triumph of the immaterial over the material, of the disembodied mind over the fleshy body points to a new phase of capitalist organization – bioinformatics – in which life itself has become subsumed to the laws of exchange and profit.

With new information sciences and technologies, Newtonian causal determinism is challenged by a turbulent universe, which involves a nonlinear organization of physical, biological and social systems. There is no simple and reversible chain of cause and effect, there is no linear

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time, but a multiplicity of potential worlds emerging from co-causal dynamics: a continual feedback that is open to emerging mutations. In this sense, matter is neither inert nor static. Materiality can no longer be thought without movement, variation, increase and decrease of energy. Newtonian physics is confronted by the fluid organization of matter, which questions the metaphysics of presence and absence, material and nonmaterial, reality and fiction, the mind and the body, nature and culture, pure and artificial. Information dynamics thus imply more than the exchange between two terms hierarchically related to each other (the sender and the receiver, the subject and the object, the self and the other). Rather, communication and reproduction entail a mutual transmission in which effects act back on their causes. Nonlinear sciences and technologies scramble the hierarchies of order regulating biological, social and economic systems relying on the linear (univocal or unidirectional) development from the simple to the complex, from homogeneity to heterogeneity, from concentration to differentiation.

The impact of information sciences and technologies, thus, radically suggests a new metaphysics of nature that envelops the momentum of contemporary culture. The digital subsumption of the biological (i.e., the informatization of the body through biotechnology, biocomputing, genetic engineering and artificial life) is not mainly to be understood according to the metaphysics of essence in which matter is declared as inert. Thus, such subsumption does not announce a neo-colonization of Man over nature. Rather, more importantly, it opens up the question about what a body is and what it can do. The body-matter no longer can be thought in terms of specific determinants – biological, social, cultural, economical or technological. For nonlinear dynamics of transmission, potential mutations define a body according to its turbulent materiality.

It would thus be misleading to assume that molecular sciences and technologies suggest that bioinformatic capitalism is the *natural* development of material communication and reproduction (from the biological to the biotechnological). This argument will merely reiterate the essentialist metaphysics of nature – based on inert matter – in contemporary culture. On the contrary, this article argues that the bioinformatic phase of capitalism, entangled to molecular sciences and technology, is, more fundamentally, enveloped in the unpredictable mutations of matter. From this standpoint, a body is neither biologically given nor socially constructed. Primarily a body coincides with its potential materiality: autocatalytic organizations trigger the emergence of new bodily compositions by swerving from linear trajectory. It is not a question of nature imitating culture or technology imitating the body. It is rather about the nonlinear processes of matter out of which distinct modes of communication and reproduction emerge on a nature-culture continuum. The lat-

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ter implies a field of continual variations – virtual matter – encompassing what we know as nature and culture.

This article argues that the new relation between the biological and the digital is above all *machinic (mutual or symbiotic relation)*. Borrowing this term from Deleuze and Guattari's *abstract materialism*,[1] this article points out that the bioinformatic subsumption of life lays out a machinic or symbiotic process in which the digital acts and is acted upon the biological; a co-causal relation that catalyses the emergence of unpredictable modifications of communication and reproduction. In other words, the impact of molecular sciences and technologies unleashes a field of potential mutations of a body – the unprecedented emergence of new modes of information transfer. Thus, the biodigital machine – the machinic assemblage of the biological and the digital – is not imposed on matter. Rather it belongs to *virtual* matter: the materiality of potentials, which do not actualize without catalyzing the emergence of new potentials.

Drawing upon Deleuze and Guattari's abstract materialism, this article suggests that the bioinformatic subsumption of the body implies the emergence of new modifications of communication and reproduction. Indeed, the body does not correspond to physical forms, biological functions, or technological extensions. Similarly, a body does not equate to social positions, cultural identities or political choices. On the contrary, a body coincides with a field of potentials, with its material becomings. In this sense, a body is not to be confused with an organism or a species. At the same time, it is not determined by cultural constructions. A body is neither primarily signified nor structured. Rather, together with Deleuze and Guattari, I would argue that a body is primarily stratified.

In Deleuze and Guattari's work, stratification maps dynamics of organization onto geological processes of sedimentation and solidification of fluids, knot points of catastrophic change, atmospheric saturations, and the rise of new layers out of the composition of previous ones. Strata are open autocatalytic systems of layers grappled onto each other. They are defined by far from equilibrium modes of communication and reproduction that include amongst many, the organic, the social and technical stratum. (see Deleuze/Guattari 1987) Thus, strata are not to be confused with structures. Strata are open systems always already crossed by flows, curves, whirlwinds, and gradients. In short, a stratified body entails the mutual organization of all layers of stratification – from the biological to the physical, cultural, economic, technological etc. – but it is also traversed by thresholds of becoming linking the potentials of these

1 Manuel DeLanda has redefined Deleuze and Guattari's ‚abstract materialism' as ‚realist materialism'. He explains that such realism does not concern essences, but dynamical processes. See DeLanda 2002: 2 also Massumi 1992, 2002.

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layers: portals of unpredictability, indeterminate modifications, emerging capacities.

This machinic stratification implies that a body has neither essence nor limits. A body is instead only composed of thresholds, tendencies and relations. Thus what distinguishes a unicellular body from a human body, or the body of capitalism from the cultural body is not a determinate form or function, biological, social or economical. All bodies are virtually linked to one another yet actualize in the most distinctive and differentiated fashion. A material body, therefore, belongs above all to the ecology of bodies – an open environment defined by the mutual actions of bodies out of which new individuations emerge. Such ecology suggests that the material body coincides with its machinic making: nonlinear actions between distinct parts generate new composition, which do not resemble them.

From this standpoint, this article argues that the bioinformatic phase of capitalism has become immanent to the machinic dynamics of matter. In other words, the capitalisation of all layers of organization across strata – from the organic to the technical body – implies the *real subsumption* of all modes of information transfer, which is actualised by the biodigital machine of communication and reproduction.[2] According to Marx, real subsumption – a tendency already in germs in the industrial organization of capitalism – defines a phase in which labor processes or processes of productivity are born within capital and incorporated not as external but as internal forces that belong to capital itself. Production no longer pertains to the individual activity of labor but becomes a social activity. Production disentangles itself from the centrality of labor to expand across all levels of communication and reproduction of information – across the organic, social and technical strata. As Negri puts it, the walls of the factory have dissipated across the entire social stratum. This „social factory" defines the phase of socialization of capitalism where capital captures and multiplies the potentials for *doing and being* rather than just being concerned with selling commodities. In this phase, potential production has become a capitalist tool. In other words, as Massumi recently argued, „our life potentials [have become] indistinguishable from capitalist forces of production". This phase of real subsumption indeed entails the „subsumption of life" under capitalism. As I will explain later in this article, the real subsumption of life – from the biophysical to the socio-cultural levels of production – introduces an immanent relation between matter and capitalism deploying auto-engineering assemblages that precede and exceed the anthropocentrism of life.

2 It is useful to specify that the word machine does not refer to a mechanical system but to the machinic engineering of singular components generating novel dynamics of organization. On the machinic that challenges the biological and mechanical opposition see Deleuze/Guattari 1983: 284.

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Yet, this phase of real subsumption has not simply substituted the so-called system of *formal subsumption* as if it were a linear progression. Formal subsumption, characterised by capitalist accumulation and centred on the productivity of labour, rather behaves like a host in the bioinformatic apparatus of capitalization that multiplies its affects in the most conservative ways (e.g., the pressures on individual responsibilities to sustain capitalist crisis). According to Marx, in formal subsumption, external labor forces are absorbed into the homeostatic system of production in such a manner that capital intervenes as their director or manager. In this arrangement, capital subsumes labor forces the way it finds it. It takes over existing labor forces developed previously or outside of capitalist production. This subsumption is formal insofar as the labor processes born outside capital's domain are subordinated to its command as an imported foreign force (Hardt 1998: 23-39). Yet, formal subsumption only works if we consider capital as a closed system of equilibrium absorbing all useful energy-force whilst expelling non-profitable ones. As Prigogine and Stengers have demonstrated, closed systems are not the rule but rather the exception of all dynamics of organization, which deploy a far from equilibrium tendency to change, which bypasses the logic of accumulation and collapse. (see Prigogine/ Stengers 1984) Thus, foreign forces are not simply used and exhausted, but have become the hosts of the bioinformatic recombination of all useless flows. Such recombination defines the real subsumption of life: the capture of emerging potentials gives way to unexpected mutations of the body. The subsumption of the body, far from reiterating a separation between material and immaterial, flesh and information, implies that everything is material. Yet, this materiality only responds to intensities, mutations, and movements. The biodigital subsumption of the body, therefore, lays out the short circuit between virtual matter and bioinformatic capitalism.

1 The Superfold

Attention has recently been focused on the fact that modern power is not at all reducible to the classical alternative „repression or ideology" but implies processes of normalization, modulation, modelling, and information that bear on language, perception, desire, movement, etc., and which proceed by way of microassemblages. This aggregate includes both subjection and enslavement taken to extremes, as two simultaneous parts that constantly reinforce and nourish each other (see Deleuze/ Guattari 1987: 458).

The processes of transformation from the formal to real subsumption of the body has also been explained in terms of a threshold from disciplinary to control society (Deleuze 1995). In the Foucauldian study of

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biopower, the fold designates the abstract diagram of disciplinary society (Deleuze 1988b). By folding external energy-forces of reproduction, the regime of social subjection of the body organizes the transmission of information through new technologies of individuation (e.g., the factory, the school, the hospital, the prison etc.). For the disciplinary archipelago of power, invariable mouldings or variations arranged biomasses into the hierarchical pyramid of individuated bodies (e.g., the worker, the pupil, the patient etc.). This irreversible folding generated a striated space of order in which regimes of signs (words-things: variables of expression) and technologies of power (socio-technical machine: variables of content) defined the disciplinary organization of all modes of reproduction and communication.

Far from determining an eternal form of organization, disciplinary subsumption constitutes a temporary assemblage in a wider dynamics of power. A critical knot of change marks the emergence and formation of ‚control societies'. Deleuze indeed suggests that the passage from disciplinary to control societies is accompanied by a breakdown of all technologies of confinement and interiority (Deleuze 1985: 80). Individuals are now decomposed onto a micro scale of assembled information: a data bank of passwords. Rather than confining forces of reproduction to fixed forms and stable functions, control modulates their variations. Its operations follow the auto-mutation of matter by changing its activity of selection from one moment to the next. As opposed to deterrence (the realm of control by simulation or pre-programming), modulation captures the interval between states, grasping the virtual tendencies of matter beyond their moment of actualization. In other words, control becomes immanent to virtual matter. Its operational continuum becomes entangled with turbulent variations whose selection accelerates their potential differentiation.

This control is inseparable from the proliferation of the technical machines of communication studied by cybernetics.[3] Cybernetic control spreads through the positive (nonlinear) feedback loops of data processing plugging the human in the machine. Third generation machines involve a symbiotic assemblage of non-analogous modes of information that results in a multiplication of their potentials of transmission – stimuli and receptions – cutting across all dynamics of communication: a virus, a bacteria, a human being, an animal, a computer. This new control distributes the Panoptical striated space of surveillance through a decentralized network of open nodes of connection modelled on the algorithmic behaviour of genetic information (for example, the architecture of peer to peer networks). The pyramidal management of the body gives in to the smooth (uninterrupted) space of potential flows through

3 On cybernetics, see C. Wiener 1989. See also K. N. Hayles 1999.

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which capitalism reaches ‚absolute speed' (see Deleuze/Guattari 1987: 492).

The disciplinary fold has trans-mutated – mutated across strata – into a *Superfold* „borne out by the foldings proper to the chains of the genetic code, and the potential of silicon in third-generation machines" (Deleuze 1988b: 131). This new diagram of power double folds the body in turbulent biodigital machines, which no longer reproduce but recombine its micro-variations of transmission. Rather than reducing variables to identities, this double folding (recombination) lays out a smooth modulation of variation. Modulation is a selection of bio-physical and bio-cultural potentials of matter, which accelerates the emergence (and not the elimination) of unpredictable assemblages in the bio-informatic phase of capitalism. In particular, the decodification (i.e., abstraction of the code-milieu relation) of the organic strata with genetic engineering and biotechnology catalyzes non-genital sex in all modes of information transmission. Biodigital modulation feeds on turbulent emergence. It captures and multiplies, rather than repressing, potentials of variation. It marks the virtual subsumption of the body to capitalism.

2 Biodigital Capital

According to Deleuze and Guattari, capital operates through a conjunction of deterritorialized (uprooted) and decoded (surplus valued) flows. It abstracts codes (formed matter) and territories (substances) from all strata and reassembles them on a new abstract plane channelling their potential of differentiation in multiple directions. The example of the wasp and the orchid suggests that abstraction involves the formation of a rhizome – a zigzagging line – assembling codes from different systems of reproduction. By pollinating the orchid, the wasp becomes a piece in the orchid's reproductive apparatus, which at the same time becomes a piece of the wasp. This ‚*aparallel evolution* of two beings that have absolutely nothing to do with each other' involves the capture of a code, an extraction that induces becoming by contamination (see Deleuze/Guattari 1987: 10). The process of abstraction accelerated by the bioinformatic capitalization of all modes of transmission entails an immanent capture of the bio-chemical, socio-cultural and techno-economic partial codes by merging all forms of value in the machinic surplus value of information.

In order to define the dynamics of the real subsumption of the body, it is important to challenge the model of evolution based on the Darwinian and neo-Darwinian notions of natural selection, competition and survival of the fittest.[4] Far from explaining processes of transformation,

4 On this conception of evolution, see Dawkins 1989.

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these theories reduce molecular variations to isolated and individuated values. On the immanent plane of relations, transformations entail the auto-assemblage of variations introducing unexpected novelties on the strata. The transformation of the means of production (from thermodynamic to cybernetic machines) involves the decodification of bio-physical and bio-cultural modes of transmission marking the emergence of a differential time crystallized in biodigital machines.

Instead of postulating a teleological whole, a capitalist system, supposed to function according to the transcendent model of selection and survival, DeLanda argues that capitalism is a complex environment of heterogeneous forces of production, populations of institutions, markets, corporations and bureaucratic agencies. Capitalism is not a general source of free enterprise and exploitation – a homogeneous and stable body always already reproducing itself. Rather, its composition changes through the fluctuating interactions of anti-markets and markets, nucleic and trading organizations. In this sense, capitalism is not a closed system of exchange engendering and subjecting all forces of reproduction. Even the individuation of monopolies and economic institutions should not be limited to a mere identification or representation of capitalism, but rather it should be exposed to the wider microphysical environment of which they are part. For example, economic institutions are always part of larger institutional organizations, such as military complex, but also wider ecosystems of desire-power that make their purpose redundant.[5]

The endosymbiotic assemblage between bacteria, animals, plants, humans and technology constitute a heterogeneous biosphere of evolution that challenges Darwinian and neo-Darwinian emphasis on individuated units of selection. Deleuze and Guattari use the notion of *Mechanosphere* to discuss immanent capitalization conjugating both biophysical and biodigital machines of information. When describing the isomorphism of stratification, the continuum and nonlinear feedback between organic, anthropomorphic and technical strata, Deleuze and Guattari prefer to avoid any confusion with cosmic and spiritual evolution. They use the notion of Mechanosphere that neutralizes the differences in kinds and degrees among strata determining hierarchies of qualification and quantification. „The apparent order can be reversed, with cultural or technical phenomena providing a fertile soil, a good soup, for the development of insects, bacteria, germs, or even particles. The industrial age defined as the age of insects […]" (Deleuze/Guattari 1987: 69). Deleuze and Guattari's mechanosphere also questions the vitalist and mechanist

5 For example, as DeLanda points out, despite its origins in the hands of military planners, the Internet itself is an entity emerging from the assemblage of synergistic agents, whose interaction has acted as a motor of complexification, as the example of computers service providers and clients demonstrates. See DeLanda 1997: 71-99.

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dualism that reduces to teleological causes the assembling processes of transformation. This mechanosphere is composed of abstract machines – the symbiotic engineering of bodies generating unprecedented compositions.[6] The abstract machine lays out the activities of pre-individual anonymous forces unleashing the unpredictable potential of all the parts participating in the assemblage. There is no internal will or external determination.[7] The machinic assemblage of forces exposes the virtual-actual circuit of mutations whereby actualizations feedback on the virtual plane of potentials. The abstract machine privileges neither biological nor social systems, organic or social structures. It is not a question of whether the biological comes before the social and the economical or the other way around. The abstract machine maps the engineering capacities of a body to compose, decompose, and differentiate beyond individuated differences (static identity). What comes first is not unity and form but a mutual process of composition: continual variations linking organic and social stratifications on a mechanosphere of turbulent becomings.

Thus, the bio-informatic capitalization of information is immanent to the microcellular variables of reproduction and communication defined by endosymbiotic evolution. Lynn Margulis argued that cytoplasmic genes (mitochondria, plastids, and cilia residing in the soma of the cell) far from being sterile, deploy a bacterial-like mode of reproduction. Information transmission does not exclusively involve the eukaryotic imperative of chromosomal or nucleic exchange and filiation. Rather, it also includes the transmission of bacterial-like organelles entrapped in the eukaryotic cell. Information is not exclusively transmissible through the germline (nucleic DNA), but also through the somaline, the bacterial-like recombination of cytoplasmic genes.

Drawing on this hypothesis of microbial evolution, it could be argued that capitalism is enveloped in the parallel coexistence of nucleic anti-markets – monopoly and hierarchies – and cytoplasmic bacterial-like trading, defining the mutual relation between these independent modes of reproduction. Chromosomal transmission at the core of sexual reproduction does not determine all orders of capitalization. Rather, nucleic reproduction is affected by bacterial and mitochondrial recombinations. The transmission of nucleic DNA is open to genetic reversibility responsible for retroviruses and pararetroviruses, operating through transverse trascriptase (RNA>DNA). In this sense, although nucleic transmission presents a more sequential organization of information, its nucleic centre (genotype or chromosomes) is continuously affected by

6 On the abstract machine, see Deleuze/Guattari 1987: 63 and 69-74.

7 The vitalist conception of capitalism presupposes economic (cultural and socio-political) transformations for capital's sake, a self-sufficient organism. The mechanical conception rather defines capital as system subjected to technological developments and therefore constructed by an external power of selection.

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non-nucleic transmission (phenotype and cytoplasmic material) able to reverse chromosomal trajectory in unpredictable fashions.

From the standpoint of endosymbiosis, it becomes problematic to distinguish nucleic apparatuses of capitalization (anti-markets) from bacterial trading of information (markets). Monopolistic organizations of information, such as nuclear genes, could feed on the most virulent trades, which would in turn expand despite aggregating monopolies. Similarly the most subverting bacterial trades could give way to the most hierarchical and rigid corporations. The question of the host and the guest in endosymbiotic dynamics remains unsolved as it deploys the expansion of molecular sexes (bacterial, viral, mitochondrial) preceding and exceeding nucleic exchange and filiation – meiotic sex. The unpredictable potentials of molecular transmission introduce a new assemblage of desire-power (nonclimactic potentials) on the strata: biodigital sex.

This biodigital recombination is embedded in the new dynamics of control: the continual modulation (the virtual capture) of chemical particles, genetic substances, and cellular forms. This modulation relies on the biodigital conjunction of all modes of reproduction and communication (from cellular phones to computer viruses, from cellular symbiosis to genetic engineering and artificial life) on a smooth space of potential production. Biodigital machines enable a virtual control of information (the present-future loop of emerging variations), tapping into differential transmission. Following Bergson, Deleuze explains that the virtual is neither the ideal nor the imaginary. It is neither possible nor given (Deleuze 1988a). The virtual defines the real potential of all actual modes of existence unleashing continual capacities of variation. The biodigital recombination of all machines of sex (bacterial, meiotic, technological) exposes a virtualization (acceleration of potential tendencies) of molecular variations through an immanent selection (positive differentiation) and modulation (positive capture) of their emergent tendencies to transmit anew.

For example, the mapping of the genome or genetic sequences constitutes the most literal examples of the new virtualization of genetic profit. The latter refers neither to a possible profit nor to its simulation. Rather, it defines its potential reality: the actual emergence of genetic potential crystallized (superfolded) in biodigital machines of transmission. As Margulis and Sagan point out, genetic recombination as a cellular process was invented by bacteria billions of eras ago. „[T]he biotechnology revolution exploits the tendency of bacteria to donate and receive each other's genes: genetic engineering is based on the ancient sexual propensities of bacteria" (Margulis/Sagan 1997: 50). Recombinant DNA or bacterial sex is at the core of virtual control. Genetic cloning or transgenesis exploits the ability of bacteria to take up and replicate any piece of DNA without treating it as foreign and rejecting it. It is not by chance

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that also media communication corporations, such as British Telecom, are looking at bacterial recombination to smooth information traffic and connect varied information packets.[8]

Although bio-technologies already suggest the process of disentanglement of reproduction from mating and sex from pleasure (sexual reproduction), mammal cloning more clearly indicates the transformation of the meiotic machine of sex on the biodigital stratum of capital. The meiotic programme of reproduction and heredity, based on chromosomal (nucleic) transmission, becomes a parthenogenic doubling (the reengineering of an unfertilized egg) of molecular variables of information transmission in the egg cell. Instead of providing an embryological model of evolution determined by genetic structures (nucleic DNA), the molecular dynamics of the egg cell unfold the schizophrenic coexistence of singular orders of transmission – nucleic and cytoplasmic – where turbulence (the cytoplasmic swerve) declines from laminar flows (layers of nucleic segments). Mammal cloning does not exclusively constitute another example of virtual control through the patenting and monopoly of information potentials. It also lays out the intensive conjunction of biophysical and biodigital molecular sexes: the bioinformatic capitalization of nonlinear transmission (nucleic and cytoplasmic). The recombination of cytoplasmic material entails a mutation of sex and reproduction, the proliferation of *microfeminine* particles as inheritable yet autonomous from the nucleic order of filiation (chromosomal exchange).

As some scientists observe, although the nucleus of a human cell contains about 100 000 genes, whilst each mitochondrion has only 37, mitochondria define many of the crucial dimensions of cellular bodies. For example, they act as *probe heads* (i.e., experimental devices) selecting which of a mother's germ cells can mature into the egg (from which an embryo will grow) and deciding the living duration of a body (Cohen 2000: 30-31). In mammal cloning, the recombination of cytoplasmic genes coming from the donor and the recipient's cells (the udder cell and the egg cell) introduces a double merger of a-segmented genetic material (mitochondrial DNA), which does not characterize sexual reproduction or biotechnological reproduction such as IVF. Mammal cloning involves a highly turbulent process of mitochondrial and cellular symbiosis irreducible to the scissiparity of the Identical. Cloning is no longer the copy of the Identical, but entails the unprecedented merger of supplementary inherited genome mapping the feminine line of bacterial recombination, known as the *Mitochondrial Eve*.[9] Mammal cloning exposes the emergence of a new kind of sex and reproduction defined by the acceleration

8 On the use of bacterial sex to accelerate information transmission, see D. Graham-Rowe 2000.

9 On the ‚Mitochondrial Eve', see R. Dawkins 1995.

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of mitochondrial transfer. In this sense, the new phase of bioinformatic capitalization introduces a new symbiotic assemblage (mitochondrial symbiosis) of the body. This new parasitism defines a reversible relation (a nonlinear feedback) between virtual control or real subsumption (the positive capture of tendencies) and emergent recombination (the auto-generation of mutations) of all modes of sex and reproduction on the bio-physical, bio-cultural and bio-technical levels of material stratification.

3 Digital Cloning

> „The philosophy of representation – of the original, the first time, resemblance, imitation, faithfulness – is dissolving; and the arrow of the simulacrum released by the Epicurean is headed in our direction. It gives birth-rebirth to a ‚phantasmaphysics'." (Michel Foucault 1977: 309)

Bio-technological machines double fold the molecular time of recombination by stretching the potentials of a body to unleash unprecedented mutations. Digital machines also capture the ceaseless replication of images by recombining information through computer imaging, rendering, and animating, CD-ROMs, CT scannings, etc. Yet, debates about the grid of digital images-information seem to reiterate the critical impasse between essentialist and constructivist metaphysics. On the one hand, image replication still corresponds to sterile repetition, pre-codified simulacrum, or mere mimicry of eternal forms, reality, being. On the other hand, images are mere projections of the mind, interpretation of the real, direct representation of the external world.

For example, in his cultural history of simulation, Jean Baudrillard associates cloning to the fourth order of simulacra that defines the age of ‚soft technologies, of genetic and mental software'. The triumph of replication, mimesis and copies ruling the economic, socio-cultural and popular scenes produces an anaesthetised space denuded of conflicts with the other. „This is our clone-ideal today: a subject purged of the other, deprived of its divided character and doomed to self-metastasis, to pure repetition. No longer the hell of other people, but the hell of the same" (Baudrillard 1993: 122). Cloning negates both the subject and the object leaving us suspended in an ocean of data, surfing digital waves in the deserted matrix of the real. For Baudrillard, cloning bypasses „the sexual function of the father and the mother, through an operational mode from which all chance sexual elements have been expunged […] as well as the otherness of the twin in the reiteration of the same" (ebd.: 115). As a mere repetition of codes, a cancerous metastasis, cloning implies the realization of the death drive, unbinding sex from reproduction, inducing regression towards inorganic replication.

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By identifying sexual reproduction with the realm of exchange and variation, Baudrillard argues that bio-digital sex marks a regressive divergence from life instincts, diversity and procreation. Cloning inherits the burden of the metaphysics of representation ante-posing the ideal to the material, the real to the copy, the organic to the inorganic. Here, bio-informatic capitalism has absorbed all forces and particles, engulfed all varieties and diversifications under its logic of replicating commodification. This Baudrillardian scenario re-affirms the negative relativism of the reality principle (based on the postponement of pleasure) and signification (the reduction of signs to signifiers) outside of which nothing is believed to happen.

Following this tradition, the digitalization of the body in virtual reality, computer imaging, rendering and animating, CD-ROMs, photography and video has been mainly considered as a process of disembodiment that dismisses the physical reality of the body-identity (the bio-categories of sex, gender, race, ethnicity, class and so on). These insights share a common conception of matter-materiality that reiterates the schism in Western culture between the line of incorporeal materialism versus the metaphysics of representation.[10]

This metaphysics imparts a split between essence-appearance, model-copy, defining images as mere imitations, mimicry of the real. In *Philebus*, Plato points to the autonomy of simulacra – huge dimensions, depths and distances out of sight from the observer – only to repress them, to accuse them of sterile effects compared to the reality of the cause defined by sight, the noblest of the senses. Sight is conceived as the inner eye of the mind able to select reality through eternal given ideas. In reversing Platonism, Luce Irigaray unravels the conjectures of the ‚myth of the cave' through which the world of pure representations – eternal ideas – speculates on the material-maternal shadows of the cave (Irigaray 1985a). Far from being the end products of eternal lights, the shadows of the cave are primarily *real*. The wet tunnels of the cave mirror the uterine environment where the philosopher is imprisoned and from where he has to depart, reaching the real enlightened by the sun outside the cave. This uterine space has been recently reconstructed in the 1999 blockbuster *The Matrix* (the Latin for womb and the Greek for hysteria) as a network of simulations echoing the Baudrillardian ‚desert of the real': the world where images have taken over reality. This cave of parthenogenic simulations imprisons humans in a matrix of copies, image replications or clonings that are deceiving shadows, distorted projections of the real. The liberation from the world of replications involves the liberation from the seduction of copies, hiding the real behind superficial disguise. This illusion is at the core of all economies of rep-

10 On the thought of the incorporeal, see M. Foucault 1977: 165-96.

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resentation detaching sight from the senses, mind from the body, the real from simulacrum, the ideal from the material. As Irigaray argues, this illusion reduces sex to the model of representation determinate by the economy of pleasure, the function of sexual reproduction and the binarism of the sexes. In this model, the female is a copy of the male, the feminine of the masculine, the woman of the man. The female is an image devoid of meaning, a projection lacking substance, a reflection of the real. Arguing against this metaphysics that reduces materiality to the end product of idealism, Irigaray points to the fluid dynamics of matter that explain the primacy of processes and transformation over the logic of solids and structures. In her work, a matter-mater-matrix continuum lays out the fluid link between matter and the female body as if it were ceaselessly under construction – a purposeless metamorphosis out of which a non-identical sex emerges. Sex is not the mirror image of something else. Images are not *images of*, but are themselves bodies. From this standpoint, feminine sex like images lacks nothing. Feminine sex, far from being differentiated from masculine sex – the referent point – lays out a multiplicity of variations that are irreducible to the metaphysics of the one and the many – the already formed and subjective reality.

The illusion of reaching the real behind simulations is only attainable through the (illusion) of organic unity-origin dismissing the fact that „behind each cave another opens still more deeply, and beyond each surface a subterranean world yet more vast, more strange. Richer still […] and under all foundations, under every ground, a subsoil still more profound" (Deleuze 199la: 263). Simulacra are not copies of ideas and forms but are bodies flying from objects and impacting on our sensory organs. As Lucretius explains: „[…] the existence of what we call images of things [is] a sort of outer skin perpetually peeled off the surface of objects and flying about this way and that through the air" (Lucretius, Book IV: 24). Atoms leave the surface of objects as complete coherent images or films, which preserve both the shape and the appearance of the object. When a film of something enters our eyes, it touches our organs of sight, stimulating perception and making us see the object. Objects emit particles that strike the eyes and provoke sight. Touch and sight are brought forth by the same stimulus as the stream of matter spreads out in all directions and without intermission. The simulacrum is an image without resemblance, incorporeal images composed of particles moving through air, rather than an image engendered by ideas. Incorporeal images are not at all unreal. They neither pre-exist nor are mediations (or interpretations) of reality. Rather, the incorporeal defies a pulsating reality, the materiality of indeterminate movement, the process of potential tendencies accompanying the composition of particles-forces: that which varies yet partakes of virtual matter in the most unrecognizable fashion. The incorporeal does not correspond to the disap-

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pearance of the real, but coincides with the primacy of processes over states – the palpable movement of bodies-images rather than the moment in which movements are arrested into states of reality.

In the tradition of representation, the Platonic and Cartesian distrust of images and bodily senses are adopted as dominant models to analyse the impact of technologies of vision on the strategies of mastering, surveillance, and subjection. (see Jay 1993) The anti-ocular tradition in Western culture and critical thought relies on this very specific understanding of vision rooted in the representational schism between the world of the material and ideal separating the visual from the audible and tangible, and the mind from the kinetics of the body. Although this separation explains the way power operates in specific socio-cultural structures in specific times, this approach does not account for the under layered processes of perception that exceed the metaphysics of representation based on the central perspective of a formed subject corresponding to an already formed world.

3.1 The Matter-Image-Body Assemblage

Overturning the Platonic tradition of representation where matter and images are always depositories of something else – the self, the real, the ideal – the bio-informatic proliferation of simulacra exposes a virtualization (an intensified differentiation) of a matter-image-body continuum crystallized and diffused through digital information transfer. In order to map the traits of this process, it is important to give some clues about matter-image-body assemblage first as conceived by Henri Bergson.

Matter, in our view, is an aggregate of „images". And by „image" we mean a certain existence which is more than that which the idealist calls a representation, but less that which the realist calls a thing – an existence placed half-way between the „thing" and „the representation" [...] the object exists in itself, and, on the other hand, the object is, in itself, pictorial, as we perceive it: the image it is, but a self-existing image (Bergson 1991: 9-10).

Arguing against the phenomenological tradition based on a centralized, subjective and organic vision, Bergson moves away from natural perception. All consciousness always partakes in something else that comes before and after our awareness of things. Before consciousness, there is movement of light and energy that exposes the incessant flow of matter stripped of stable form and purposeful function. As composed of light-energy flows, matter is an agglomeration of images whereas perception and memory, as attributes of the mind, are modes of accessing to the present and the past movement of image flowing. Rather than the hidden force lying behind the body and the image, according to Bergson, matter is composed of moving particle-lights acting as forces of contrac-

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tion and extension, where my body, my eyes, my brain are images; they do not represent or contain anything. By defining the independence of matter from subjective perception, Bergson's materialism also defies metaphysical idealism.

The body is the place of movements received and thrown back. The body is a place of connection between things, which act on the body and the things upon which the body acts. The body as an image constitutes at each point a section of virtual matter – the plane of immanence – without centre or pulsations, without interiority. Virtual matter lays out a unity (a holding together rather than the homogeneity of form) of disparate levels of actual emergence: virtual tendencies accompanying actual compositions out of which the image I call my body emerges.

In the tradition of representation, the body is an already structured organism – an already determinate system of central organs of perception in which the hierarchy of the senses is displayed (sight over hearing, touching and smelling) as if receiving stimuli by mirroring and then processing specific features of an already formed outside. For *abstract materialism*, the body is not composed of organs (or individuated unities) but it is an aggregation of partial bodies in movement. Relations of particles and forces acting upon each other and composing a mutant whole that exceeds the sum of its parts. Indeed, a material body only coincides with indeterminate senses or regions of relative immobility: portals of resonating virtual matter.

For phenomenology, the act of perception is a reflection of what is already pre-embedded in the world. It repeats the same structures, expressing where you already were. In this case, perception becomes a reflective exercise, a repetition without novelty. Here perception becomes equated with intention – „a way of establishing an identity between the structure of the world and the structure of the subject in the world" (Massumi 2002: 287, note 14). On the contrary, for Bergson, perception arises from and returns to matter – a plane of immanence. Perception without reflection partakes of the lived experience that far from being a subjective experience, deploys the *experimental* process of movement: the virtual making of the world.

Perception, according to Bergson, is never a representation of something. Rather, it conveys actions. Perception grasps the action of the body upon things and the action of things on the body. Perception is always an action that links the past to an immediate future. Hence, an image is not merely there to be seen; its duration can be heard, felt, touched. For example, an image is produced each time we listen or feel something not simply because it reminds us of something that we have seen. Matter as an agglomeration of images-bodies defines a continuum between perception and memory that mixes what we have seen with

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what we are about to see. The movement from matter (repetition of images) to memory (individuating zone of perception) displays the activities of perception: arresting the real actions of external things on the body in order to retain that which is virtual. „[T]his virtual action of things upon our body and of our own body upon things is our perception itself" (Bergson 1991: 232). Perception is a selection that does not serve to shed more lights on things but to arrest the incessant flows of images-things impacting on the body.

Rather than defining the disappearance of material variations, the digital replication of images modulates (captures and unleashes the potential tendencies of) kinetic movements of particle-lights, the virtual action of images-bodies. The impact of digital simulacra on the body's zones of perception enlarges the leap – the interval – between stimuli and response by that exposes an intensification of percepts[11] leading to a mutation of the senses. Digital cloning defines the proliferation not of copies of the original but of virtual actions of images-things increasing and decreasing the capacities of a body to be affected and to act.[12] Here perception is neither subjective nor objective, but emerges and returns to the swerving flows of matter (virtual planes of intensive duration). Digital perception blends in recombinant information. It entails a virtual action on the body's capacities of reception and action, unleashing the emergence of unprecedented sensory mutations.

For example, by generating a haptic space, digital mapping defines new modes of orientation, the linkages and landmarks conveying a sense of immersive audio-visual experience. This is an audible and touchable experimentation, in which the body moves on a grid of recombined information and the eye itself acquires haptic or nonoptical functions. The eye no longer separates objects. But objects become rather part of a fractional, flat heterogeneity participating in the same matrix of information (virtual matter). In this space points of reference are interchangeable and recombinant, they are „‚monadological' points of view [that] can be interlinked only on a nomad space" (Deleuze/Guattari 1987: 94). This is the ultra and multi sensuous space of electronic and digitised time based media crystallizing (capturing potentials) the emerging tendencies of matter (i.e., these media participate in the present-future loop of bodily actions and reactions, in which an intensified delay discloses sensory perception to emerging mutations).

11 As Deleuze and Guattari explain, perceptions are neither natural nor constructed. They are compositions of sensations, compounds of percepts and affects that exist in the absence of man, of subject and object, as they are themselves compounds of percepts and affects (164). Perceptions are not state of affairs but a state of assembling bodies induced by other bodies – the virtual impact on a body that acts and is acted upon other bodies. See Deleuze/Guattari 1994: 163-199.

12 On the impact of digital images on perception, see Parisi/Terranova 2001: 121-128.

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Far from defining the end of the body, sex and reality, digital cloning marks the introduction of a new mode of perception emerging from the capacities of a body to be affected and to act. Digital cloning increases some channels of affection-action rather than others, entailing the (positive) selection of some stimuli-receptions rather than others. It exposes the liquid nature of perception always linked to the assemblage of percepts and affects mutating across bio-physical and bio-cultural modes of information transmission. In other words, the impact of digital cloning on sensory perception involves a mutating materiality of the real whose consequences are yet unforeseen.

4 Incorporeal Mutations

> „[…] we add that incorporeal transformations, incorporeal attributes, apply to bodies and only to bodies."
> (Gilles Deleuze / Félix Guattari 1987: 86)

Biodigital machines introduce a new level of order in the stratification of a body: a turbulent recombination of all modes of reproduction and communication out of which a mutant sex is emerging. Genetic engineering decodifies (extends beyond its actual forms and functions) the organic entanglement between sex, reproduction and death (the link between sexual reproduction, survival, filiation and evolution). It operates by superfolding or crystallizing the capacities of molecular variables to differentiate anew. Genetic engineering builds up the diagram of bioinformatic capitalization: the real subsumption of life accelerates rather than reducing the potentials of matter to recombine and mutate beyond recognition.

At the same time, digital cloning involves a deterritorialization (uprooting) of the field of sensory perception, which entangles the body in a matrix of energy-information, capturing the molecular movements of virtual matter. Digital cloning indicates the emergence of a hypersensorial perception that implies an unpredictable mutation of the body's apparatus of reception and action. By intensifying the virtual action of the body on images-things and viceversa, digital cloning is encompassed by the unknown capacities of a body to be affected and to act. Hence, perception can only belong to a virtual ecology of bodies with their variable capacities of reception and action. Perception merges with a swarm of *percepts* that are independent of the state of those who experience them. They define the „nonhuman landscape of nature" (Deleuze/Guattari 1994: 169), traversing unformed sensations.

This article has therefore argued that the real subsumption of the body to capital entails an immanent modulation of the molecular variables of a body – cellular, genetic or electrodigital. Such immanence does not

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cease to occur without facing the unpredictable potentials of virtual matter. The continual recombination of all modes transmission (from bacterial sex to cybersex) gives way to biodigital sex that detracts the body-sex from states of equilibrium (biological, cultural or technical identity). It prolongs the virtual actions of matter (its tendencies towards variation) as long and as much as possible demanding that flows of transmission never reach a final climax (the pleasure of determinate positions). Biodigital sex enfolds anticlimactic contagions, which are indexes of a transition or intense variation from one phase to another, the symbiotic assemblage of biological and technological levels of matter. Biodigital sex thus points to a transductive time that links the past with the future. Biodigital sex (from mammal to digital cloning) is an index of the turbulent knots of a present futurity out of which new modes of communication and reproduction emerge.

Biodigital sex cuts across the model of organic evolution based on binary sexes, heredity and filiation, survival of the fittest, death and life drives, pleasure and unpleasure, which reduces the body-sex to a given essence (a biological, socio-cultural and bio-technological identity). Virtual matter enfolds the mutations of sex and reproduction that go beyond the human and the post-human (the organic and technological determinants of matter). Biodigital sex belongs to the incorporeal mutations of matter preceding and exceeding the imperative of sexual reproduction and technological determinism. These mutations indeed entail the symbiotic assemblages of bio-physical, bio-cultural and bio-technical bodies: microbes, multicells, signs and techniques. These assemblages are not just additions of distinctive parts summing up to a new whole. Rather, they entail an engineering concatenation of parts that generate a new partial layer of stratification that does not cease to actualize without unleashing a bio-informatic warfare: the immanent collision between all strata of sex.

This new collision is an *event* on the process of stratification as it marks a momentum of reversible parasitism (interdependent coexistence) between virtual control and virtual matter. This host and guest relation discloses a condition of coexistence between nucleic and bacterial organizations of sex cutting across all layers of stratification. This is a condition of potentials and not of possibility that far from reifying the dominance of Man over nature, radically clashes with a virtual matter bypassing the dualistic opposition between information and the body, the biological and the machine. This article thus suggests a *machinic*, mutual or symbiotic, making of the body-sex out of which potential mutations of matter link the most distinct states. A body-sex thus never ceases to become in the contagious rubbing of strata.

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