

## DELEUZE AND LIFE

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“Life” was a major theme for Deleuze, so much so that he would say at one point: “Everything I’ve written is vitalistic, at least I hope it is...” (N, 143). But before we get out the pitchforks at this uttering of a forbidden word, we should remember Deleuze’s love of provocation, and read the beginning of the passage to see his idiosyncratic notion of vitalism: “There’s a profound link between signs, life, and vitalism: the power of nonorganic life that can be found in a line that’s drawn, a line of writing, a line of music. It’s organisms that die, not life. Any work of art points a way through for life, finds a way through the cracks.” (N, 143)

In this article we will skirt the relation of life and art,<sup>1</sup> however, and instead focus upon Deleuze’s writings that are aimed at life as it is understood in the biological register.<sup>2</sup> We’ll begin with a guide to some key biophilosophical investigations in Deleuze’s single-authored masterpiece, *Difference and Repetition*: Chapter 2 on organic syntheses and organic time, and Chapter 5 on embryogenesis.<sup>3</sup> Then, in the second part of the article, we will consider several biophilosophical themes in Deleuze and Guattari’s *Anti-Oedipus* and *A Thousand Plateaus*, addressing “vitalism,” “life,” “nature,” “content and expression,” “evolution and involution,” “milieus, codes, territories,” “nonorganic life,” “body without organs,” and “organism.”

### *DIFFERENCE AND REPETITION*

Deleuze’s overall aim in *Difference and Repetition* is to provide a “philosophy of difference,” in which individuals are seen as produced by the integration of a differential field, or the solution of a “problem” (DR, 211); a paradigm case would be lightning produced from a field of electrical potential differences between cloud and ground (119). The philosophy of difference counters what we might call identitarian philosophy in which individuals are seen as produced by a prior individual. A paradigm case for identitarian philosophy would be a parent giving birth to a child: there is always a horizon of identity (the family lineage) within which differences can be located. Following Gilbert Simondon,<sup>4</sup> Deleuze certainly notes differences between physical and living individuation: physical individuation occurs all at once, at a boundary that advances; biological individuation occurs via “successive waves of singularities” triggering qualitative changes that affect the entire internal milieu of an organism (DR, 255). But Deleuze will show that a philosophy of difference

(individuation from a field of difference) is not restricted to physical events like the lightning case, but can also account for living individuation, so that children are also integrations of a differential field (of epigenetic and genetic factors). In fact, the philosophy of difference maps form and content such that its basic model (individuation as integration of a differential field) is itself divided into (or “differentiated,” to use a technical Deleuzian term we will explain shortly) its physical and biological models without compromising its universality. In this way, the physical and biological models can apply to either register without reducing the difference between the registers. Thus children, like all other individuals, are lightning flashes (“every phenomenon flashes [*fulgure*] in a signal-sign system” [222]), just as clouds, like all other differential fields, are “eggs” (“the world is an egg” [251]).

*Organic time and organic syntheses.*

Deleuze provides two genetic accounts in *Difference and Repetition*, static and dynamic; in terms we will explain later, the static moves from virtual Idea to actual individual, while the dynamic moves from immediate object of intuition to Idea.<sup>5</sup> Chapter 2 of *Difference and Repetition* is part of Deleuze’s dynamic genesis moving from intuition to Idea; in this section he will establish the form of organic time as, literally, a “living present.”<sup>6</sup> Deleuze drives down to the most basic syntheses; he shows how beneath active syntheses (thought) are passive syntheses (perception) and beneath passive perceptual syntheses are passive organic syntheses (metabolism).<sup>7</sup> The challenge is to describe passive syntheses in differential terms, so as to avoid the “tracing” of empirical identities back to transcendental identities; avoiding such “tracing” is a basic principle of Deleuze’s thought. In other words, passive syntheses are genetic or constitutive of the identities that arise within their series; there is no perceiving subject prior to the series of perceptions nor is there a living subject prior to the series of metabolic “contractions.” Perceptual and metabolic syntheses are not grounded but are grounding.

Deleuze will distinguish the organic and perceptual syntheses by showing that organic syntheses “perform a contraction” or induce a habit in their own, material, register. For Hume and Bergson, as Deleuze reads them, the psychological imagination moves from past particulars to future generalities, so that from a series of particulars we come to expect another of the same kind. Deleuze will abstract the process of “drawing a difference from repetition” as the essence of contraction or habit and show that it occurs at the organic level as well as on the level of the passive perceptual imagination (73).<sup>8</sup> Perceptual syntheses thus refer back to “organic syntheses,” which are “a primary sensibility that we *are*” (73; emphasis in original). Such syntheses of the elements of “water, earth, light and air” are not merely prior to the active synthesis that would recognize or represent them, but are also “prior to their being sensed.” So each organism, not only in its receptivity and perception, but also in its “viscera” (that is, its metabolism), is a “sum of contractions, of retentions and expectations” (73). Here we see the form of organic time, the level of what is literally the “living present” of retention and expectation. Organic retention is the “cellular heritage” of the organic history of life and organic

expectation is the "faith" that things will repeat in the ways to which we are accustomed. So Deleuze has isolated a "primary vital sensibility" in which we have past and future synthesized in a "living present." At this level, the future appears as need, as "the organic form of expectation," and the retained past appears as "cellular heredity" (73).

Now we must distinguish two genres of contraction in Deleuze's treatment: (1) contraction as activity in series as opposed to relaxation or dilation, and (2) contraction as fusion of succession of elements. With the second form of contraction, we come upon the notion of a "contemplative soul" which must be "attributed to the heart, the muscles, nerves and cells" (DR, 74). Deleuze knows the notion of an organic "contemplative soul" might strike his readers as a "mystical or barbarous hypothesis." but he pushes on: passive organic synthesis is our "habit of life," our expectation that life will continue. So we must attribute a "contemplative soul" to the heart, the muscles, the nerves, the cells, whose role is to contract habits. This is just extending to "habit" its full generality: habit in the organic syntheses that we are (DR, 74).<sup>9</sup> Organic syntheses operate in series, and each series has a rhythm; organisms are polyrhythmic: "the duration of an organism's present, or of its various presents, will vary according to the natural contractile range of its contemplative souls" (DR, 77). The rhythm of organic syntheses can be seen from two perspectives, "need," and "satiety" (or "fatigue" in the sense of being tired of something, fed up with something). Deleuze writes: "need marks the limits of the variable present. The present extends between two eruptions of need, and coincides with the duration of a contemplation" (DR, 77). "Fatigue," then, is being fed up, being overfull, when "the soul can no longer contemplate what it contracts" (77). There are thousands of such rhythmic periods between need and fatigue, periods that compose the organic being of humans: from the long periods of childhood, puberty, adulthood and menopause to monthly hormonal cycles to daily cycles (circadian rhythms) to heart beats, breathing cycles, all the way down to neural firing patterns. Everything organic, each "contemplative soul," has a period of repetition, everything is a habit, and each one of these repetitions forms a living present that synthesizes the retention of the past and the anticipation of the future as need.

### *Organic individuation.*

To appreciate fully Deleuze's treatment of individuation in Chapter 5 of *Difference and Repetition*, we must make a brief foray into Deleuze's metaphysics, where we find a tripartite ontological scheme, positing three interdependent registers: the virtual, the intensive, and the actual. For Deleuze, in all realms of being (1) intensive morphogenetic processes follow the structures inherent in (2) differential virtual multiplicities to produce (3) localized and individuated actual substances with extensive properties and differentiated qualities that, in the biological realm, can be used in classification schemes that distinguish species from each other and distinguish the organs of an organism from each other. Simply put, the actualization of the virtual, that is, the production of the actual things of the world, proceeds by way of intensive processes.

In a fuller picture of Deleuze's ontology, we see that the virtual field is

composed of "Ideas" or "multiplicities," which are constituted by the progressive determination of differential elements, differential relations, and singularities; what are related are precisely intensive processes, thought as linked rates of change (DR, 182-191). Beneath the actual (any one state of a system), we find "impersonal individuations" or intensive morphogenetic processes that produce system states and beneath these we find "pre-individual singularities" (that is, the key elements in virtual fields, marking system thresholds that structure the intensive morphogenetic processes). We thus have to distinguish the intense "impersonal" field of individuation and its processes from the virtual "pre-individual" field of differential relations and singularities that make up an Idea or multiplicity. But it's even more complex than just three modes or registers, for we have to distinguish "individuation" as the field of individuation (called variously "the egg" or the "metastable field"), from "dramatization" as the process of individuation (embryogenesis or "spatio-temporal dynamisms"). Deleuze has thus a four-fold "order of reasons: differentiation-individuation-dramatization-differenciation (organic and specific)" (DR, 251; translation modified). Differentiation is the mark of the virtual, the "pre-individual," while differenciation is the mark of the actual, the fully individuated end product. So both "individuation" and "dramatization" are intensive and impersonal; they are the field and the process of individuation.

A simple example distinguishing field and process of individuation can be found in the meteorological register, where the *field* of individuation is composed of the cloud-ground system with its electrical potential differences, while lightning is the process of individuation, the production of an event. On a slower temporal scale, the field of individuation of a weather system would be bands of different temperature and pressure in air and water which exist prior to and allow for the morphogenesis of wind currents or storms, which are the spatio-temporal dynamisms, the *process* of individuation of a singular event, sometimes worthy of its own name, as with hurricanes. In the biological register, an example of the field of individuation is the egg, while the process of individuation is embryogenesis; to save Deleuze from tracing empirical individuation back to a transcendental identity qua "genetic program" we must see the biological virtual as the differential Idea of genetic *and* epigenetic factors, as does the contemporary school of thought known as Developmental Systems Theory or DST.<sup>10</sup>

A very important point for Deleuze in his account of the biological model for ontogenesis is the priority of individuation to differenciation. In other words, singular differences in the genesis of individuals must precede the categories into which they are put; creative novelty must precede classification. As Deleuze puts it: "Individuation precedes differenciation in principle ... every differenciation presupposes a prior intense field of individuation. It is because of the action of the field of individuation that such and such differential relations and such and such distinctive points (pre-individual fields) are actualized" (247). Individuation is thus the answer to the question "who?" not the essentialist "what is?" Individuals are singular events before they are members of species or genera; a species is a construct, an abstraction from a varying population of singulars. Deleuze is insistent here: we have to beware the "tendency to believe individuation is a continuation of the determination of species" (247). Deleuze puts it very strongly: "any reduction of

individuation to a limit or complication of differentiation compromises the whole of the philosophy of difference. This would be to commit an error, this time in the actual, analogous to that made in confusing the virtual with the possible" (247). The key point is that "individuation does not presuppose any differentiation; it provokes it" (247; translation modified). In other words, Deleuze must distinguish between any comparable difference between individuals – difference within a horizon of resemblance (i.e., representation), which can be classed in genus and species – and divergent difference or "individual difference," the difference thought by Darwin, the "differentiation of difference," that which does not track genus and species but produces it via natural selection as a stabilizing procedure. Making species turn around individual and diverging difference is Darwin's "Copernican Revolution" (247-249; see also ATP, 48).

In seeking a concrete example of the precedence of individuation, Deleuze now turns to embryos, where he must finesse what looks to be a contradiction to his insistence on the priority of individuation to differentiation. Commenting on von Baër, Deleuze admits that embryonic life goes from more to less general.<sup>11</sup> However, this generality "has nothing to do with an abstract taxonomic concept" (that is, it is not produced by differentiation as conditioning the comparison of the properties of finished products in a classification scheme), but is "*lived* by the embryo" in the process of individuation-dramatization (DR, 249; emphasis in original). Thus the "experience" of the embryo (dramatization as "spatio-temporal dynamism" or morphogenetic process, the third element in the order of reasons) points "backwards" as it were to the first two elements of the order of reasons (differentiation and "individuation" as field), rather than "forward" to the fourth element (differentiation). The experience of the embryo points to differential relations or virtuality "prior to the actualization of the species" and it points to "first movements" or the "condition" of actualization, that is, to individuation as it "finds its field of constitution in the egg" (249). This means that the lived generality of the embryo points "beyond species and genus" to the individual (that is, to the field of individuation and that process of individuation) and to pre-individual singularities, rather than toward "impersonal abstraction" (249). So even though the specific form of the embryo appears early, this is due to the "speed and relative acceleration" of the elements of the individuation process, that is, to the "influence exercised by individuation upon actualization or the determination of the species." Thus a species is an "illusion – inevitable and well founded to be sure – in relation to the play of the individual and individuation" (249-250).

At this point, Deleuze provides a fascinating critique of genetic determinism. First, we are reminded again of the primacy of individuation over differentiation, and that the "embryo is the individual as such caught up in field of its individuation" (250). After the famous phrase "the world is an egg" (251) we read that "the nucleus and the genes designate only the differentiated matter – in other words, the differential relations which constitute the pre-individual field to be actualized; but their actualization is determined only by the cytoplasm, with its gradients and its fields of individuation" (251). Again, the virtual is "pre-individual," while the intensive is "impersonal." By showing how the genetic expression in ontogenesis is determined by cytoplasmic conditions Deleuze is thus prefiguring a move in

contemporary biology, known collectively as “Developmental Systems Theory” (see note 10 above) away from a self-identical and transcendent genetic program to a differential network of genetic and epigenetic factors controlling development. This move to a differential virtual structuring organic individuation matches the Deleuzian principle of critique, the outlawing of the tracing relation between transcendental / virtual and empirical / actual, a principle that commands a non-resemblance of actualized species and parts to virtual differential relations and singularities. Deleuzian critique also commands the non-resemblance of both virtual multiplicity and actual adult individual to the intensive processes of morphogenesis or to what Deleuze calls the lived experience of the embryo. The twists and folds of embryogenesis do not resemble either the virtual network of relations among DNA strings and epigenetic factors or the actual structures and qualitatively different cell types of the adult organism.

To conclude this all-too-brief sketch of organic individuation in *Difference and Repetition*, we see that, for Deleuze, the “principal difficulty” of embryology is posing the field of individuation formally and generally (252). Eggs thus seem to depend upon the species. But this reverses the order in which individuation precedes differentiation. So we must conceive individuating difference as individual difference: no two eggs are identical (252). Organic individuation, field and process together, is a singular event preceding differentiation. Once we’ve seen that, we’ve traced the order of reasons from (1) virtual differentiation through (2) the impersonal and intensive field of individuation to (3) spatio-temporal dynamisms as the process of individuation or dramatization to (4) differentiation as the formation of species and “parts,” that is, qualitatively different cell types and functions which can then be classified in taxonomic schemes.

#### *ANTI-OEDIPUS AND A THOUSAND PLATEAUS*

*Difference and Repetition* is different in both form and content to *A Thousand Plateaus*. While *Difference and Repetition* has the classical form of a *thèse d’Etat* – and *Anti-Oedipus* still has something of the same linear argument – *A Thousand Plateaus* is written as a “rhizome,” a non-centered “open system,” with many occasions for reading “transversally” across its chapters or “plateaus” (ATP, 3-25). We will thus present our reading of *Anti-Oedipus* and *A Thousand Plateaus* thematically, rather than attempting to construct a narrative. In terms of content, we find a shift as well. *Difference and Repetition* focuses on how individuation determines the actualization of virtuality, whereas in *A Thousand Plateaus* the focus is on the intermeshing of different rhythms of intensive processes. *Difference and Repetition* is thus somewhat “vertically” oriented (from virtual to actual and back), whereas *A Thousand Plateaus* is more “transversal” (the meshing or clashing of intensive processes). These relative emphases should not be hardened into theses, however, especially as the terms “plane of consistency” and “abstract machine” in *A Thousand Plateaus* do seem to have an ontological status a reader of *Difference and Repetition* would see as “virtual.”

With these preliminary remarks, let us turn to our treatment of

biophilosophical them in AO and ATP.

*Vitalism.* We began this article with one of Deleuze's provocations, in which he proclaimed his writings "vitalistic" (*épater les bourgeois* is an old French philosophical gesture), but Deleuze is not vitalistic in any technical sense of espousing a non-material intelligent guiding force, a "vital principle" or "life force" or "entelechy."<sup>12</sup> He proclaims himself a monist and materialist in many passages; Deleuze and Guattari go so far as to call fascism "a problem of pure matter, a phenomenon of physical, biological, psychic, social, or cosmic matter" (ATP, 165). But, as we will explain below, Deleuze is a machinic materialist, not a mechanist, and it is only as a reaction to mechanism that classical vitalism makes sense. It is the impoverished sense of matter in mechanism, as chaotic or passive, that creates the temptation to classical vitalism of the "entelechy" type. Seeing matter as chaotic or passive creates the need for a hylomorphic rescue in which a transcendent organizing force swoops down to instill a form that organizes the matter. But Deleuze learned from Gilbert Simondon to mistrust hylomorphism, as much for its social origins in command relations as for its metaphysical assumptions (ATP, 408-10). What we need to look for in Deleuze's notion of vitalism is the "life" that encompasses both organisms and "non-organic life." This life concerns the capacity for novel emergent properties in the self-organization of material systems, a conception that bypasses the dichotomy that would oppose a vital life force or entelechy to mechanistic biochemistry and physics.

*Life.* For Deleuze and Guattari, "life" has a double sense, reflecting both stratification and destratification. It means both "organisms" as a certain set of stratified beings and it also means the creativity of complex systems, their capacity to produce new emergent properties, new behavior patterns, by destratifying and deterritorializing. Organisms are "a particularly complex system of stratification" (ATP, 336), while life qua creativity is "a surplus value of *destratification* ... an aggregate of consistency that disrupts orders, forms, and substances" (ATP, 336; italics in original). In the second, creative sense, one example of which is speciation, the creation of novel "orders, forms, and substances," then, life is not limited to the organism form: "the organism is that which life sets against itself in order to limit itself" (503). This notion of life as creativity gives rise to "the prodigious idea of *Nonorganic Life*" (411; italics in original), which we gloss as creative self-organization of material systems in registers other than the "organismic." As we will shortly see, by "organism" Deleuze and Guattari mean both homeostatic or autopoietic conservation of a living entity, and organ patterning useful to social machines.

*Nature.* By various terms built around the word "machine," Deleuze and Guattari offer a conceptual scheme that allows us to treat inorganic, organic, and social being with the same concepts. They thus strive for an ontological naturalism, a stance that would refuse to see humans as separate from nature. This sort of naturalism is apparent in the beginning of *Anti-Oedipus*, where a schizophrenic's stroll shows "a time before the man-nature dichotomy... He [the schizophrenic] does not live nature as nature [i.e., as separate from man], but as a process of production" (AO, 2). The

schizophrenic's being in contact with nature as "process of production" allows us to see man as "the being who is in intimate contact with the profound life of all forms or all types of beings, who is responsible for even the stars and animal life" (AO, 4).

The term used for the "profound life" of nature's process in *Anti-Oedipus* is "desiring-production." Crisscrossing Marx and Freud, Deleuze and Guattari use "desiring-production" to put desire in the eco-social realm of production and production in the unconscious realm of desire. Desiring-production is a "universal primary production" (AO, 5) underlying the seemingly separate natural (earthly and biological) and human (psycho-social) realms. Desiring-production is not anthropocentric; it is the very heart of the world; all natural processes, even those well beyond the human, are processes of machinic desiring-production: "everything is a machine. Celestial machines, the stars or rainbows in the sky, alpine machines... nature as process of production" (AO, 2). Universal in scope, desiring-production is also immanent and non-subjective – there is no subject that lies behind the production, that performs the production – and purely positive – the desire in desiring-production is not oriented to making up a lack (AO, 25). Desiring-production is immanent, autonomous, self-constituting, and creative: it is the *natura naturans* of Spinoza or the will-to-power of Nietzsche.

The machinic naturalism of *Anti-Oedipus* should not be confused with "mechanism," that is, the law-bound repetition of physical events with creativity shuffled off from dead matter into some spiritual realm. For Deleuze and Guattari, nature as desiring-production or process of production is the linking together of "desiring-machines" (AO, 5). A desiring-machine is formed in the breaking of a material flow produced by one machine by another machine: "there is always a flow-producing machine, and another machine connected to it that interrupts or draws off part of this flow (the breast—the mouth)" (AO, 5). Although these machinic connections are for the most part patterned repetitions under the sway of a geological process, a biological species, or a social machine, there is always the chance for novel connections to be formed. For example, human desiring-machines are often patterned by the social machines into which they fit, but not always; there's always a slippage, a derailment that would allow for novel connections, often made by artists (AO, 31).

In *A Thousand Plateaus*, "desire" drops out of the description of nature, which is described in terms of "abstract machines" and "machinic assemblages." Again, as in *Anti-Oedipus*, "machinism," the term for creative self-organization of material systems, is not mechanism, or deadened, routinized, repetition. In fact, we could say, mechanism is a residue of machinism: creativity comes first, then routinization. In *A Thousand Plateaus'* terminology, "strata" (forms which induce mechanical repetition) are ontologically secondary to "lines of flight" (which provide the occasion of creative novelty by disrupting – "destratifying" and "deterritorializing" – stratified, mechanical, processes). Deleuze and Guattari write: "what is primary is an absolute deterritorialization, an absolute line of flight ... it is the strata that are always residues ... The question is not how something manages to leave the strata but how things get into them in the first place" (ATP, 56). As we will see in more detail below, "organism" is one of three strata "binding" humans to patterned repetitions (ATP, 159).



Despite the ontological priority of lines of flight, stratification is chronologically “simultaneous” with destratification and is a “very important, inevitable phenomenon that is beneficial in many respects and unfortunate in many others” (ATP, 40). Nature as process, *natura naturans*, is thus bivalent, constituting an “abstract machine” of stratification – a tendency to hierarchically ordered, mechanically repetitive systems – and destratification – a tendency to experimental, creative processes or “lines of flight.” Nature as stratification is called “the judgment of God” (ATP, 40) while destratification allowing creative novelty is called “life” (ATP, 336; 503; 507); as we will see, such life can be “non-organic.”

While stratification produces a body composed of homogenous layers, destratification allows the construction of “consistencies” or “assemblages,” functional wholes that preserve the heterogeneity of their component parts and enable further non-hierarchical or “rhizomatic” connections (ATP 505). The “abstract” part of the term “abstract machine” simply means that the processes of stratification and destratification occur in many material registers, from the geological through the neural, the biological through the social. An “abstract machine” is thus the diagram for processes that form functional wholes in different registers (ATP, 510-514). In sum, nature forms strata and it also breaks down such strata, freeing parts to form connections with heterogeneous others in consistencies or assemblages.

*Content and expression.* In one of their most bewildering slogans, Deleuze and Guattari tell us in the “Geology of Morals” chapter of *A Thousand Plateaus* that “God is a Lobster” (40). The term is meant to indicate the “double articulation” of the stratification process. To explain double articulation, they develop a specialized terminology of “form-substance” and “content-expression” which can be read with regard to organisms (ATP, 40-45).

Content is that which is put to work in a stratum or assemblage, while expression is the takeover of content, putting it to work in a “functional structure.” As the first articulation of stratification, content is composed of bodies whose recruitment from a substratum retrospectively qualifies them as matter for that stratum. Stratified content has both form and substance. The “substance of content” is homogenized matter selected out from a heterogeneous source or exterior milieu. The “form of content” is the ordering of those selected elements by a code which is in turn overcoded by the “form of expression” to produce an emergent functional structure or “substance of expression” (ATP, 41). In the double articulation characteristic of stratification, content is relative to its expression, so that what is content for one expression can itself be the expression of another content.

In strata (actualized systems, to use the terms of *Difference and Repetition*), expression takes part in a double articulation, and ultimately results in a new substance, with new emergent, albeit fixed, properties, while in assemblages (intensive fields and processes of individuation), expression results in new affects, new capacities to form further assemblages (in the best case). Within the system of the strata, expression takes different forms. Following Simondon 1995, Deleuze and Guattari write that in the inorganic strata, expression is the molarization of molecular content, that is, the carrying forth to the macroscopic scale of the ‘implicit

forms' of molecular interactions (57). On the organic stratum, expression becomes autonomous in the linear genetic code, which results in greater deterritorialization (greater behavioral flexibility) of organisms due to "transductions" (59-60). In some parts of the "alloplastic" (niche-constructing) stratum, expression becomes "linguistic rather than genetic," that is, achieves a "superlinear" or temporal form allowing "translation" (60).

On the organic stratum, content and expression must be specified at many different scales: genes and proteins, cells, tissues, organs, systems, organism, reproductive community, species, biosphere. In Deleuze and Guattari's discussion of genes and proteins the substance of content, the materials drawn from the "pre-biotic soup" as substratum, are amino acids, and the form of content or coding of these acids are amino acid sequences or proteins (ATP 42; 59). Expression, as we recall, is the putting of content to work, so the form of expression at this scale is composed of nucleotide base sequences, which specify amino acids, while the substance of expression, the emergent functional unit, is the gene, which determines protein shape and function.<sup>13</sup> Skipping over several scales (cell, tissue, organ) for simplicity's sake, we arrive at the level of organic systems (e.g., the nervous, endocrine, and digestive systems), where the substance of content is composed of organs and the form of content is coding or regulation of flows within the body and between the body and the outside. The form of expression at this level is homeostatic regulation (overcoding of the regulation of flows provided by organs), while the substance of expression, the highest level emergent unifying effect, is the organism, conceived as a process binding the functions of a body into a whole through co-ordination of multiple systems of homeostatic regulation.

*Evolution and involution.* Deleuze and Guattari have a strong and a weak sense of the creative transformation involved in the production of biological novelty. The strong sense is novelty that does not produce substantial filiation (i.e., does not produce an organism with descendants); this can be connected to the notions of "niche-construction" and "life cycle" in DST.<sup>14</sup> The weak sense is novelty that does produce substantial filiation (an organism with descendants); this can be connected to the notions of "serial endosymbiosis" in the work of Lynn Margulis<sup>15</sup> and "developmental plasticity" in the work of Mary Jane West-Eberhard.<sup>16</sup>

The strong sense, which excludes substantial filiation, is expressed in the following passage from the "Becoming-Intense" plateau of *A Thousand Plateaus*:

Finally, becoming is not an evolution, at least not an evolution by descent and filiation.... It concerns alliance. If evolution includes any veritable becomings, it is in the domain of *symbioses* that bring into play beings of totally different scales and kingdoms, with no possible filiations. There is a block of becoming that snaps up the wasp and the orchid, but from which no wasp-orchid can ever descend. (238; emphasis in original)

We can connect this to the thoughts of "niche construction" and "life cycle" in DST. Here, "niche construction" looks to the way organisms actively shape the environment and thus the evolutionary selection pressures for themselves and their offspring. Thus evolution should be seen as the change in organism-environment systems, that is, the organism in its constructed niche. It's the "becoming" of the

organism-in-its-niche that needs to be thought as the unit of evolution (e.g., the “wasp-orchid”). In generalizing and radicalizing the thought of niche construction, DST thinkers propose the “life cycle” as the widest possible extension of developmental resources that are reliably present (or better, re-created) across generations. DST thinkers thus extend the notion of inheritance beyond the genetic to the cytoplasmic environment of the egg (an extension many mainstream biologists have come to accept) and beyond to intra-organismic and even (most controversially) to extra-somatic factors, that is, to the relevant, constructed, features of the physical (for example, termite colonies<sup>17</sup>), biological (inherited symbionts), and social environments (for example, normal brain development in humans needs positive corporeal affect and language exposure in critical sensitive windows). This notion of “life cycle” as the unit of evolution encompassing intranuclear, cytoplasmic, organic, and extra-somatic elements comes close to what Deleuze and Guattari refer to above as “symbioses that bring into play beings of totally different scales and kingdoms.”

The weak sense of biological novelty is that which does result in a substantial filiation, that is, organisms with descendants. There is still the emphasis on heterogenous elements entering a symbiosis, but the result has organismic form. The foremost connection here is with the work of Lynn Margulis (1998) who posits that symbiosis, rather than mutation, is the most important source of variation upon which natural selection works. Her most famous example is mitochondrial capture at the origin of eukaryotic cells. Margulis holds that mitochondria were previously independent aerobic bacteria engulfed by anaerobic (proto-nucleated) bacteria; eukaryotic cells thus formed produce the lineage for all multicellular organisms. Serial endosymbiosis thus short-circuits the strict neo-Darwinist doctrine of mutation as origin of variation upon which we find selection of slight adaptations. Although there is organismic filiation here, Margulis’s notion of evolution via the symbiosis of different organisms seems at least in line with the spirit of what Deleuze and Guattari call “involution” (ATP 238-239). (We will discuss the relation of Deleuze and Guattari’s work to that of Mary Jane West-Eberhard in the next section.)

*Milieus, codes, and territories.* As we note above, the discussion of evolution in *A Thousand Plateaus* emphasizes what is now called “niche-construction” or the action of an organism on its environment such that the selection pressure for future generations are changed.<sup>18</sup> Here the discussion deploys the terms of milieus, codes, and territories. We begin with “milieu,” which is a vibratory, rhythmic, and coded material field for bodies (strata) and territories (assemblages). Heterogeneous milieus are “drawn” by rhythms from chaos, while territories form between ever-shifting milieus. Now milieus are coded—the “code” is the repetition of elements such that milieus are a “block of space-time constituted by the periodic repetition of the component” (313). But there is always “transcoding” or change of pace so that “rhythm” is the difference between one code and another: “there is rhythm whenever there is a transcoded passage from one milieu to another, a communication of milieus, coordination between heterogeneous space-times” (313). The notion of rhythm here is differential or intensive; it is to be distinguished

from metered or extensive cadence: "rhythm is critical; it ties together critical moments" (313). "Critical" here means a threshold in a differential relation, a singularity in the linked rates of change of a living system in its ecological niche.

Milieus and rhythms are thus interrelated. Milieus are coded and repetitive – but the rhythm is always shifting in "transcoding" (313). Every living being has four milieus:

1. The exterior milieu, materials furnished by substratum (49);
2. The interior milieu, the domain of homeostasis for the composing elements and composed substances (50);
3. The intermediary milieu or set of membranes (51) which establish the possibility of "epistrata" as stable states determined by homeostatic set points;
4. The annexed or associated milieu (51), the ecological niche or "parastrata," in turn composed of (a) sources of energy different from food (respiration); (b) the discernment of materials (perception); and (c) the fabrication of compounds (response / reaction).

Rhythm is the difference between one code and another, so rhythm and the milieu are relational: "A milieu does in fact exist by virtue of a periodic repetition [i.e., a code], but one whose only effect is to produce a difference by which the milieu passes into another milieu" (314). Codes are that which determines order (in a milieu, or as forming a body in content-expression). Every code has a "margin of decoding" (53; 322) from two factors: supplements (unexpressed genetic variation, that is, non-coding DNA) and transcoding or "surplus value of code" (transverse communication or serial endosymbiosis) (314).

Territorialization affects multiple milieus and rhythms. Territories themselves have exterior, interior, intermediary, and annexed milieus (as do bodies) (314). With territories, milieu components are no longer directional but now dimensional, that is, they are no longer merely functional, but now expressive (315). There are thus now qualities as matters of expression. For example, color in birds or fishes is functional when tied to an action (when it indicates readiness for physiological function: feeding, fighting, fleeing, mating), but it is expressive when it marks a territory. The difference is temporal: functional color shifts are transitory and tied to the action, while expressive color has a "temporal constancy and a spatial range" (315). Territories depend on decoding: The key is the disjunction of code and territory (322): "the territory arises in a free margin of the code", that is, while in milieus there is transcoding, territories are associated with decoding.

When they note that there is non-coding DNA as a "free matter for variation," Deleuze and Guattari add that in their view the simple presence of non-coding DNA is not enough for creative speciation, as "it is very unlikely that this kind of matter could create new species independently of mutations" (322; see also 53). On the other hand, in the views of some recent biologists, mutation is not the only means of providing variation for selection; such free DNA can serve as "unexpressed genetic variation" allowing "environmental induction" of novel phenotypic traits leading to evolutionary change in specific circumstances.<sup>19</sup> Deleuze and Guattari's text resonates with this notion when they note that there are "events of another order [i.e., other than mutation] capable of multiplying the interactions of the organism

with its milieus" (ATP, 322). This other factor is territorialization, which has both spatial and intensification effects. Spatially, it spreads organisms out, making them keep their distance from each other. It also intensifies the relation of the organism and its milieus; it speeds up evolution from having to wait for mutation:

"Territorialization is precisely such a factor that lodges on the margins of the code of a single species and give the separate representatives of that species the possibility of differentiating [translation modified from "differentiating"]" (322). Remembering the principle of the priority of individuation we saw in *Difference and Repetition*, we should read "differentiating" here as tracking the concrete process of creating singular differences in individuation processes; we can connect this notion of singular, creative, and concrete organic individuation with that of "developmental plasticity" in relation to shifting milieus as they are territorialized in "niche-construction."<sup>20</sup>

*Consistency / non-organic life.* Non-organic life or the establishment of "consistency" is the linking together of heterogeneous elements to produce emergent properties in functional structures in a variety of registers beyond the organismic (507). Consistency is not achieved by imposing a form on matter, but by "elaborating an increasingly rich and consistent material, the better to tap increasingly intense forces" (329); such assemblages are creative in their self-ordering, that is, their makeup lends itself to novel becomings. However, consistency is not "restricted to complex life forms, [but] pertains fully even to the most elementary atoms and particles" (335). Thus "aggregates" [*ensembles*] can achieve consistency when "very heterogeneous elements" mesh together to achieve emergent effects, thus forming a "machinic phylum" (335).

Because of this extension of consistency and its creative emergence beyond complex life forms we find "non-organic life" in technological assemblages crossing the organic and the inorganic as in the "man-horse-bow assemblage" (391; 406; 411). Nonorganic life is creativity outside the organism form, occurring in the physical, the evolutionary-biological, and the technological-artistic registers. Such creativity in the latter register is often named a "war machine," or a horizontal, rhizomatic social formation always exterior to the stratifying, homogenizing, social formation of the "State": "Could it be that it is at the moment that the war machine ceases to exist, conquered by the State, that it displays its irreducibility, that it scatters into thinking, loving, dying, or creating machines that have at their disposal vital or revolutionary powers capable of challenging the conquering State?" (ATP, 356).

*Body without organs or BwO.* To reach the plane of consistency – to be open to new orderings and new potentials – and organism must be dis-ordered, it must reach its "body without organs." This term is responsible for much confusion; it would have been better to call it by the more accurate but less elegant term, a "non-organismically ordered body."<sup>21</sup> Deleuze and Guattari write: "the BwO is not at all the opposite of the organs. The organs are not its enemies. The enemy is the organism" (158). A BwO retains its organs, but they are released from the habitual patterns they assume in its organism form; in so far as the organism is a stratum (a

centralized, hierarchical and strongly patterned body), a BwO is a destratified (decentralized, dehabituated) body. Adding to the potential confusion is a significant change in the term “full BwO” from *Anti-Oedipus* to *A Thousand Plateaus*. In *Anti-Oedipus*, the BwO is “full” when it is catatonic, a moment of anti-production, a mere surface across which desiring-machines are splayed (AO 8). In *A Thousand Plateaus*, however, the full BwO is positively valued; it is the “empty” BwO that must be avoided. The full BwO allows for connection with other destratified bodies, while the empty BwO is a black hole for subjectivity, where nothing happens (ATP, 150).

A BwO is not a regression to a natural state, despite the impression given by this remark, in which the BwO is described as “what remains after you take everything away” (151). Rather, it is an object of construction, a practice needing cautious experimentation to reach a “plane of consistency,” a region in which one is now open to a field of new connections, creative and novel becomings that will give one new patterns and triggers of behavior. In dynamic systems terms, the BwO is the organism moved from equilibrium, out of a stable state or comfort zone (a certain functioning set of homeostatic mechanisms and regulated habits), to an state in which it is capable of producing new – and continually changeable – habits.

A BwO is not reached by regression, for a BwO is not the infantile body of our past, but the realm of potentials for different body organization precluded by the organism form. Thus it is reached by a systematic practice of disturbing the organism’s patterns, which are arranged in “exclusive disjunctions” (specifying which organs can ever meet and outlawing other possible connections). In this way a body of purely distributed, rather than centralized and hierarchized, organs can be reached, sitting upon its underlying matter-energy flow. In other words, a BwO is purely immanently arranged production; matter-energy flowing without regard to a central point that drains off the extra work, the surplus value of the organs for an emergent organic subject in a “supplementary dimension” (265) to those of the organs (159). Since all actual bodies must make choices, the key ethical move is to construct a body in which patterning is flexible, that is, to stay in a sustainable intensive ‘crisis’ situation, where any one exclusive disjunction can be undone and an alternate patterning accessed.

As an object of practice reached starting from the organism, the BwO needs to be cautiously constructed by experimentation with body practices: “staying stratified -- organized, signified, subjected -- is not the worst that can happen” (159). Nor is the BwO an individualist achievement: “For the BwO is necessarily ... a Collectivity [*un Collectif*] (assembling [*agencant*] elements, things, plants, animals, tools, people, powers [*pusissances*], and fragments of all of these; for it is not ‘my’ body without organs, instead the ‘me’ [*moi*] is on it, or what remains of me, unalterable and changing in form, crossing thresholds)” (161).

*Organism.* We will conclude this tour of biophilosophical themes with the notion of organism, a notion whose centrality for other biophilosophies Deleuze and Guattari challenge. For Deleuze and Guattari, an organism is type of body; it is a centralized, hierarchized, self-directed body. A body is a system considered in terms of appropriation and regulation of matter-energy flows; in Spinozist terms, it is a material system with a characteristic “longitude” or “relation” of the “speeds and

slowness” among its constituent parts (ATP, 260). (Bodies also have “latitude” or “the sum total of the intensive affects it is capable of at a given power or degree of potential” [260].) At a lower level of analysis, a body is an assemblage of organs; at higher levels, a body may itself be an organ in a social body. A body is thus a node in a production network that is plugged into a network of other flows, slowing some down, speeding others up. A stratum is composed of homogenized bodies put to work by an overcoding agent, while a consistency is an assemblage that retains the heterogeneity of the bodies composing it.

The organism is an emergent effect of organizing organs in a particular way, a ‘One’ added to the multiplicity of organs in a ‘supplementary dimension’ (ATP 21; 265). As we have seen in discussing *Anti-Oedipus*, an organ is a “desiring-machine,” that is, an emitter and breaker of flows, of which part is siphoned off to flow in the economy of the body. Organs are a body’s way of negotiating with the exterior milieu, appropriating and regulating a bit of matter-energy flow. The organism is the unifying emergent effect of interlocking homeostatic mechanisms that quickly compensate for any non-average fluctuations below certain thresholds to return a body to its statistically normal condition. The organism is “a phenomenon of accumulation, coagulation, and sedimentation that, in order to extract useful labor from the BwO, imposes upon it forms, functions, bonds, dominant and hierarchized organizations, organized transcendences” (ATP 159). The organism is hence a construction, a certain selection from the range of what a body can be, and hence a constraint, an imposition, a limitation: “The BwO howls: ‘They’ve made me an organism! They’ve wrongfully folded me! They’ve stolen my body!’ ” (ATP 159). While all bodies are “ordered,” that is, contain some probability structure to the passage of flows among their organs, the organism is “organized,” that is, its habitual connections are centralized and hierarchical. The organs of an organism are patterned by “exclusive disjunctions” which preclude the actualization of other, alternative, patterns (AO, 75-76).

There is also a political sense of “organism” we should discuss. “Organism” refers to body patterns being centralized so that “useful labor is extracted from the BwO” (159). We see that “organism” is a term for a particular type of political useful body when we realize that for Deleuze and Guattari the opposite of the organism is not death, but “depravity”: “You will be an organism ... otherwise you’re just depraved” (159). That is, being an “organism” today in Western capitalism means that your organs are Oedipally patterned for hetero-marriage and work. Getting outside the organism does not mean getting outside homeostasis guaranteed by a certain organic form so much as getting outside Oedipus into what Oedipal society calls “depravity.” So we have to think the body as socially patterned, and the experimentation Deleuze and Guattari call for is not so much with somatic body limits (although that is part of it) but with bio-social-technical body relations in what Deleuze and Guattari will call a “consistency” or even a “war machine”: “every creation is brought about by a war machine” (229-230; 356; 360).

## CONCLUSION

We have provided a brief overview of some biophilosophical themes in *Difference and Repetition*, *Anti-Oedipus*, and *A Thousand Plateaus*. Researchers are working on exploring the relations between Deleuze's works and that of the biologists he reads (see note 3); further work is needed there as well as in using Deleuze's conceptual scheme(s) to discuss contemporary biophilosophical concepts such as developmental plasticity (West-Eberhard 2003); autopoiesis (Maturana and Varela 1980); "process structuralism" (Goodwin 1994; Kauffman 1993); serial endosymbiosis theory (Margulis 1998); and Developmental Systems Theory (see note 10). Such "extended synthesis" models provide for multi-level, interlocking, distributed systems for cell, organ, organism, and life cycle development and function in an evolutionary perspective. Deleuze provides a philosophical context for this endeavor, one that provides a vocabulary and ontological scheme for interlocking processes of the formation, deformation, and transformation of self-organizing physical-biological-political systems.



## WORKS CITED

- Ansell Pearson, Keith. 1999. *Germinal Life: The difference and repetition of Deleuze*. London: Routledge.
- Bogue, Ronald. 2003. *Deleuze on Music, Painting and the Arts*. New York: Routledge.
- Bonta, Mark and Protevi, John. 2004. *Deleuze and Geophilosophy: A Guide and Glossary*. Edinburgh: Edinburgh University Press.
- Canguilhem, Georges, Lapassade, Georges, Piquemal, Jacques, and Ulmann, Jacques. 2003 [1962]. *Du développement à l'évolution au XIX<sup>e</sup> siècle*. Paris: PUF.
- Caygill, Howard. 1997. The Topology of Selection: The Limits of Deleuze's Biophilosophy. In Keith Ansell Pearson, ed. *Deleuze and Philosophy: The Difference Engineer*. London: Routledge.
- Colebrook, Claire. 2010. *Deleuze and the Meaning of Life*. London: Palgrave Macmillan.
- DeLanda, Manuel. 1997. *A Thousand Years of Nonlinear History*. New York: Zone Books.
- . 2002. *Intensive Science and Virtual Philosophy*. London: Continuum.
- Goodwin, Brian. 1994. *How the Leopard Changed its Spots: The Evolution of Complexity*. New York: Charles Scribner & Sons
- Grosz, Elizabeth. 2008. *Chaos, Territory, Art: Deleuze and the Framing of the Earth*. New York: Columbia University Press.
- Hansen, Mark. 2000. Becoming as Creative Involution?: Contextualizing Deleuze and Guattari's Biophilosophy. *Postmodern Culture* 11.1.  
[http://muse.jhu.edu/journals/postmodern\\_culture](http://muse.jhu.edu/journals/postmodern_culture).
- Hughes, Joe. 2008. *Deleuze and the Genesis of Representation*. London: Continuum.
- . 2009. *Deleuze's Difference and Repetition*. London: Continuum.
- Kauffman, Stuart. 1993. *The Origins of Order: Self-Organisation and Selection in Evolution*. New York: Oxford University Press.
- Lewontin, Richard. 2000. *The Triple Helix: Gene, Organism, and Environment*. Cambridge MA: Harvard University Press.
- Margulis, Lynn. 1998. *Symbiotic Planet: A New Look at Evolution*. New York: Basic Books.
- Marks, John. 1998. *Gilles Deleuze: Vitalism and Multiplicity*. Pluto.
- . 2006. Molecular Biology in the Work of Deleuze and Guattari. *Paragraph: A Journal of Modern Critical Theory* 29.2 (July): 81-97.
- Maturana, Humberto and Varela, Francisco J. 1980. *Autopoiesis and Cognition: The Realization of the Living*. Boston: Riedel.
- May, Todd. 2005. *Gilles Deleuze: An Introduction*. Cambridge: Cambridge University Press.
- Oyama, Susan. 2000. *The Ontogeny of Information: Developmental Systems and Evolution*. Durham: Duke University Press.
- Oyama, Susan, Griffiths, Paul, and Gray, Russell, eds. 2001. *Cycles of Contingency: Developmental Systems and Evolution*. Cambridge MA: MIT Press.
- Pigliucci, Massimo and Müller, Gerd, eds. 2010. *Evolution: The Extended Synthesis*. Cambridge MA: MIT Press.
- Protevi, John. 2011a. Larval subjects, enaction, and *E. coli* chemotaxis. In Laura

- Guillaume and Joe Hughes, eds. *Deleuze and the Body*. Edinburgh University Press.
- , 2011b. Mind in Life, Mind in Process: Toward a New Transcendental Aesthetic and a New Question of Panpsychism. *Journal of Consciousness Studies*, 18.5-6: 94-116.
- Sander, Klaus. 1992. Hans Dreisch's "philosophy really ab ovo" or why to be a vitalist. *Development Genes and Evolution* 202.1: 1-3.
- , 1993. Entelechy and the ontogenetic machine – work and views of Hans Dreisch from 1895 to 1910. *Development Genes and Evolution* 202.2: 67-69.
- Sauvagnargues, Anne. 2004. *De l'animal à l'art*. In *La Philosophie de Deleuze*. Paris: Presses Universitaires de France.
- , 2005. *Deleuze et l'art*. Paris: Presses Universitaires de France.
- , 2009. *Deleuze. L'empirisme transcendantal*. Paris: Presses Universitaires de France.
- Shaviro, Steven. 2010. Interstitial Life: Remarks on Causality and Purpose in Biology. In Peter Gaffney, ed. *The Force of the Virtual: Deleuze, Science, and Philosophy*. Minneapolis: University of Minnesota Press: 133-146.
- Simondon, Gilbert. 1995. *L'individu et sa genèse physico-biologique*. Grenoble: Millon.
- Turner, J. Scott. 2000. *The Extended Organism: The Physiology of Animal-Built Structures*. Cambridge MA: Harvard University Press.
- West-Eberhard, Mary Jane. 2003. *Developmental Plasticity and Evolution*. New York: Oxford University Press.
- Zahavi, Dan. 2005. *Subjectivity and Selfhood: Investigating the First-Person Perspective*. Cambridge: MIT Press.

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<sup>1</sup> Treated ably in Bogue 2003, Sauvagnargues 2004 and 2005, and Grosz 2008.

<sup>2</sup> The founding work in examining Deleuze's biophilosophy is Ansell Pearson 1999. Also of interest are, in addition to the works cited in note 1: Caygill 1997; Hansen 2000; DeLanda 1997 and 2002; Parisi 2004; Braidotti 2002 and 2006; Toscano 2006; Shaviro 2010; and Colebrook 2010.

<sup>3</sup> We will, regrettably, not be able to discuss Deleuze's relation to the biological thinkers whom he cites – an important field of research already well underway See Ansell Pearson 1999 on Darwin; Bogue 2003 on Raymond Ruyer; Sauvagnargues 2004, 2005, and 2010 on Gilbert Simondon, Georges Canguilhem, and Geoffroy Saint-Hilaire; and May 2005 and Marks 2006 on François Jacob and Jacques Monod.

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<sup>4</sup> Simondon 1995; see also Sauvagnargues 2004 and 2009.

<sup>5</sup> Hughes 2008 and 2009.

<sup>6</sup> We should note that organic time, the synthesis of habit producing the living present, is only the “foundation” of time. Deleuze’s full treatment of time in *Difference and Repetition* posits a second synthesis of memory producing the pure past as the “ground” of time, while the third synthesis, producing the future as eternal return of difference, we might say unfounds and ungrounds time.

<sup>7</sup> Many of the major commenters on *Difference and Repetition* – Hughes 2009; Bryant 2008; Beistegui 2004; Williams 2003 – do not isolate the level of organic synthesis. The exceptions are Ansell-Pearson 1999 and DeLanda 2002.

<sup>8</sup> Deleuze cannot go directly to his key notion of organic synthesis because he must first free a notion of habit from the illusions of psychology, which fetishizes activity. For Deleuze, psychology, by fear of introspection, misses the element of passive “contemplation.” Indeed, current work in philosophical psychology says the self cannot contemplate itself due to fear of an infinite regress of active constituting selves (Zahavi 2005).

<sup>9</sup> I pursue the theme of organic subjectivity inherent in Deleuze’s notion of “contemplative soul” in Protevi 2011a and 2011b.

<sup>10</sup> The school of thought questioning the genetic program notion in favor of a notion of a distributed and differential field of interacting genetic and epigenetic factors is often called “Developmental Systems Theory.” The main works here are Oyama 2000; Lewontin 2000; and Oyama, Griffiths, and Gray 2000. DST themes are also treated in Pigliucci and Müller 2010.

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<sup>11</sup> Although it does not appear in the bibliography of *Difference and Repetition*, Deleuze and Guattari do refer to the original version of Canguilhem et al 2003 in *A Thousand Plateaus* (522, n.9). It might be the source for the discussion of von Baër in *Difference and Repetition*.

<sup>12</sup> On the notion of entelechy developed by Hans Dreisch, see Sander 1992 and 1993.

<sup>13</sup> Note that in this treatment we are overlooking the DNA / RNA relation, the dependence of genes on cellular metabolism, and the role of genes in intervening in the self-organizing processes of morphogenesis.

<sup>14</sup> See note 10.

<sup>15</sup> Margulis 1998.

<sup>16</sup> West-Eberhard 2003.

<sup>17</sup> Turner 2000.

<sup>18</sup> See Pigliucci and Müller 2010 for a discussion of niche-construction.

<sup>19</sup> West-Eberhard 2003: 145; 499ff.

<sup>20</sup> West-Eberhard 2003.

<sup>21</sup> The term first appears in Deleuze's writings, in a Lacanian-psychoanalytic idiom, in the latter part of *Logic of Sense* in the "dynamic genesis" of sense from corporeal forces. The collaboration with Guattari in *Anti-Oedipus* produced the occasion for Deleuze's "escape" from psychoanalysis.