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The Signifying Body

A semiotic concept of embodiment

If biosemiotics is right in claiming the fundamentally semiotic character of biological processes, then this should throw a new light upon the concept of “embodiment” so fashionable in recent linguistics and philosophy. The semiotic “missing link” issue of the previous chapter must thus be a special case only of the more general issue of the emergence of semiotically competent body types during evolution: a natural history of the signifying body.

In traditional semiotic thought, however, the body has been almost ignored. If we take structuralist semiotics, we should expect a treatment of the body as of any other concept in language, persuading us that the body differs in different languages, cultures, in short in different semiotic systems and that a study of such different systems will show us as many different cultural representations of the body. No extra-structural constraints are supposed to determine the spectrum of possibilities of body representation.

Thus, the body would be conceived of as a concept subjected to the free arbitrariness of semiotic systems - and no special attention would be paid to the body as a crucial prerequisite to semiotic articulations. This ignorance of the body is about to undergo a complete change – epitomized in the widespread popularity of different versions of the concept of *embodiment*. What is called for is a concept of the body which, in itself, makes evident the basic semiotic competences of an organism – thus, a body concept which entails semiotics. It is to be expected, naturally, that this will give rise to a more fine-grained typology of bodies depending on how complicated and sophisticated semiotic behavior the organism in question is able to indulge in.

This “embodiment” turn of semiotics which has been underway during the recent decades, has called for new interest in old positions all the way back to Aristotle, as well as a reorientation in actual tendencies of biology and philosophy. Among the former count reappropriations and reinterpretations of the foundations of ethology and theoretical biology, exemplified here in Jakob von Uexküll, as well as a renewed interest in phenomenology, exemplified here

in Maurice Merleau-Ponty's work with its focus upon the body and the "flesh" as the necessary concept to avoid sterile mind-matter dualisms. Among the latter count the cognitive semantics movement (Eleanor Rosch, George Lakoff, Mark Johnson, Leonard Talmy, Mark Turner, Gilles Fauconnier, etc.) and its emphasis on the "embodiment" of cognitive structures; the "complexity theory" around the Santa Fe school (Murray Gell-Mann, Christopher Langton, Brian Goodwin, Stuart Kauffman) and its reinterpretation of classical issues of theoretical biology within the framework of a general theory of complexity; and finally, within semiotics itself, the emergence of "biosemiotics" (Thomas Sebeok, Terrence Deacon, and the Copenhagen school (Jesper Hoffmeyer, Claus Emmeche) to which I myself to some extent belong as a fellow-traveller).

This paper will briefly present and discuss the body concepts involved in these developments and their semiotic possibilities.

Cognitive semantics - the body in the mind

The well-known American tradition in linguistics and philosophy known as "Cognitive Semantics" or "Cognitive linguistics" (Lakoff, Johnson, Turner, Fauconnier, Sweetser, Talmy, Langacker, etc.) has, during the recent 25 years, provided a new view of language, loosening the autonomy of linguistics in order to connect it to developments in cognitive science - using insights from psychology, philosophy, comparative literature, anthropology, neurology, etc. "The linguistic turn" is rolled back - language is seen as a specific combination of a series of different, cognitive, pre-linguistic competences. In doing so, Cognitive Semantics covers a large field of semiotic issues; thus it constitutes one of the main developments of semiotics from 1980 onwards - even if it most often does not explicitly use the term "semiotics".

A very basic tenet in this tradition has been its insistence on the bodily motivation of cognitive, semantic, and linguistic structures. Such structures are claimed to be "embodied". This claim is aimed against the formalist and logicist trend in American analytical philosophy and linguistics (especially against the Chomskyan tradition) - that is, against the tacit or outspoken assumption that the bodily basis of thinking beings is irrelevant for the study of thought and language (which may then be studied by purely logical, formal means) - a famous version of this claim is Putnam's old "functionalist hypothesis" equating mind and brain with computer software and hardware, respectively. Against the implications of this analogy (the brain as a Turing machine able to "run" any mental program ...), the idea is that the specific architecture of body and brain is fundamental to thought and language. This part of the program has been made explicit especially in Lakoff and Johnson's large tractatus *Philosophy in the Flesh* (1999).

A closer look reveals, though, that it is not always completely clear what is intended by the embodiment claim. The following subclaims constitute the details of the embodiment hypothesis.

a) A philosophy must be true to bodily experiences - instead of indulging in A Priori philosophizing. This implies, in turn, two things. It must be open to the results of the various sciences pertaining to bodily experience - psychology, anthropology, linguistics, neurobiology, etc. Furthermore, it must refrain from universal claims, since all facts about the mind depend on the empirical variation studied by these special sciences, cf. the so-called “experientialism” of Lakoff and Johnson. It is important to note, however, that these two claims are not necessarily connected. The interdisciplinary view of cognitive processes implied by the former does not entail the anti-apriorism of the latter. Rather, a Husserlian idea of a priori structures with necessary conceptual networks underlying the special sciences would easily fit with interdisciplinarity, and it may be argued that Cognitive Semantics often, in fact, involves a priori arguments without admitting it (the embodiment hypothesis could, *inter alia*, be seen as exactly an a priori hypothesis).

b) Reason and thought use, to a large extent, competences of the sensori-motor system - in conceptualizing phenomena in terms of spatial and motor relations borrowed from or directly relying upon these systems. This implies the possibility of sensori-motor inferences: structures from these parts of the brain facilitate reasoning determined by spatial and motor properties of the phenomena intended.

This idea is exemplified in two core hypotheses of Cognitive semantics: the dependency of language and thought upon two fundamental sets of semantic primitives, “basic-level concepts” and “kinaesthetic image schemata”, respectively. Both are cognitive entities which are inherently meaningful due to the fact that we know them from our bodily interaction with the environment (hence, they are not vulnerable to the “symbol grounding problem” asking about the foundation of the meaning and reference of symbols - they are always-already meaningful). The first idea stems from psychological investigations by Eleanor Rosch and claims that the fundamental concepts in the human mind refer to types of things or actions with which we have a basic, typical motor experience - and of which we can hence form simple schematic image representations. Chairs, tables, cars, houses; walking, talking, sleeping, etc. The basic idea is thus that our sensori-motor acquaintance with the world determines our fundamental concepts – an idea not foreign to an Uexküllian point of view. More abstract concepts (“furniture”, “vehicles”, “movement”, “action” etc.) lack associated specific motor programs as well as a clear schematic images in terms of the specific whole-and-part structures of the phenomenon in question.

More specific concepts, on the other hand (“kitchen table”, “Louis XVI chair”, “dozing”, “marching”, etc.) are formed as subclasses of the basic level concepts by further specifying the actions and images involved on the basic level. The specific lexicon of basic level concepts is, of course, culture dependent. It has a core, motivated by basic bodily functions, but large parts of it are relative to the perception and action practices developed on top of them in a given culture.

Image-schemata are embodied Gestalts (be they explicit or not) used in perception and reasoning: part-whole, center-periphery, link, source-path-goal, cycle, iteration, contact, adjacency, forced motion, support, balance, straight-curved, and near-far, and a few more, but probably not many more. The idea is that we tacitly know these Gestalts, their structure, and the inferences which they support, from our ordinary bodily activity; they are crucial aspects of what it is to be a body. Their description thus adds to the implicit body theory of cognitive semantics: a body is hence characterized by goal-oriented behaviour (source-path-goal); connectedness (container); stable mereological-anatomical structure (part-whole); hierarchical structure - head/body vs. limbs (center-periphery), orientation in gravity fields (up-down) etc.

A crucial implication of these hypotheses is a dissolution, or, at least, a relativization of the perception-conception boundary: concepts are motivated (but not exhaustingly determined) by structures in perception and action. A further crucial implication is that these basic bodily experiences provide the starting point for more sophisticated mental activity; thus abstract thought is taken to arise from metaphorical projections of these structures from the basic bodily field and onto other domains more remote from sensori-motor activity. The extensive metaphor theory of this tradition is constructed on the basis of this hypothesis, rendering metaphor an important cognitive tool, giving rise to structural metaphors, each of them underlying many linguistic metaphorical expressions. The structural, conceptual metaphor “Knowing is seeing” known in many languages thus gives rise to a long series of different expressions like “enlightenment”, “Can’t you see what I explain?”, “Take a closer look at this problem” etc. This gives the implication, in turn, that imagination becomes an important cognitive tool, not only in these conceptual metaphorical projections, but also in the trial-and-error construction of more elaborated conceptual models in thought experiments, so-called “idealized cognitive models”, built from basic concepts, image schemata and layers of mappings between them.

This gives a rough picture of the body concept at stake in cognitive semantics. There are, however, certain problems in that concept. It is not at all clear what is the precise extension of these claims. The immediate - prototypical - body referred to here is, of course, the human body. The general reference is to “our body and brain”, this “our” supposedly referring to the body and brain of the human species, but the extension of this expression is unclear in at least two dimensions. One is “downwards” in the animal kingdom: how many of these

competences used in the description of this body concept hold for higher animals? We should probably expect higher animals to make use of basic level concepts and kinaesthetic image schema as well - but maybe to a lesser extent the metaphorical extensions of these basic toolsⁱ. Another is “sideways” in a Kantian manner, so to speak: are these claims valid not only for the contingent, empirical human race but for any possible reasoning subject as such? Cognitive Semantics itself gives an explicit answer to this question: no. They claim their theory is empirically built by the investigation of human languages referring to the human body and brain and thus reject all a priori reasoning. Still, a problem remains here. Even if it is easy to agree with Cognitive Semantics that theories of meaning which disregard the body must themselves be disregarded, it is less easy to agree that their theory itself is, in fact, purely “experiential” and without any a priori assumptions. Some of the assumptions used are taken from various special sciences, true, but this does not entail they have no a priori validity.ⁱⁱ So the question remains whether it is, in fact, the case that any possible real intelligence must possess some sort of a body, conceptualize in some set of basic level concepts and use some repertoire of kinaesthetic image schemata, etc.? This a priori question is not answered within Cognitive Semantics, but as far as I can see, it becomes a crucial question for generalized semiotics on the one hand and theoretical biology on the other.

Another problem in the theory is that the relation between embodiment and general semiotic competences is fairly underdeveloped. If a body is characterized by instantiating (some of the) Gestalt schemas mentioned, this does not in any way imply that that body is necessarily able to *understand*, still less *represent* such schemata nor build language from them. A bacterion behaves according to the source-path-goal schemas (when swimming upstream in the sugar gradient thanks to its “biased random walk”), it instantiates the container and part-whole-schema by its closed cell membrane, and so on, but this does not in any way imply that it has any mental representation of those schemata. Ability to reason with such schemata requires the tacit or explicit mental *representation* of them, separated from actual sensori-motor behavior, due to the kinaesthetic sense and to the existence of sensori-motor integrative body images in the nervous system. Here, Cognitive Semantics is in need of further underpinning of neurological as well as phenomenological work on these issues.

von Uexküll revisited - the body as functional circle

We have already discussed a theory at the root of ethology which has reflected some of these problems in a proto-semiotic manner and which has gained wide

renewed interest in semiotic circles during the last decades: von Uexküll's "Umweltlehre". The functional circle in von Uexküll provides, in fact, a very basic sensori-motor body conception, described in semiotic terms: perceptions and actions are classed as sign types: *Merkzeichen* and *Wirkzeichen*, respectively, all in all making up the "Umwelt" of the species in question. The body and its surroundings are thus conceived of as correlatively defined entities: a body is a body only with respect to its niche in a specific *Umwelt*, and vice versa. This definition of the body is thus correlated with that of the environment it constitutes. In this conception of the organism, the body *per se* is conceived as a semiotic device: it is an intrinsic property to a body that it is able to perceive the surroundings through signs and act correlatively through signs. The extension of this definition of the body to what is later called "endosemiosis" is natural: when one part (the external parts) of the functional circle requires sign use, why not other parts (the internal parts) of it?

We saw that von Uexküll vacillated with respect to admitting the existence of *neutral objects* (not defined by correlated actions) in higher animal *Umwelten*. But the choice for us is easy: neutral objects are necessary, *precisely* because they disrupt the virtually perfect fit between organism and *Umwelt*. The existence of general – underspecified – perception and action diagrams are hesitantly admitted in von Uexküll. And this generality in *Umwelt* relation of any body increases with complexity of the organism and its related perception and action patterns. The perception of neutral objects is, importantly, a prerequisite to learning because learning in some sense consists of nothing but the de-neutralization of neutral objects, drawing them into more complicated segments of functional circles. But in order to be thus invested with meaning, neutral objects, of course, must be phenomenologically present *before* their use in learning. The perfect fit between organism and environment must thus be relativized: life time adaptability presupposes to some degree the perception of neutral objects, not immediately functionally relevant.

As we saw, the musical metaphor in von Uexküll has, on the other hand, a crucial implication which is never made explicit in the *Umweltlehre*. In the same manner as tonally discrete music, the body-surrounding fit is possible only through *discretization* of the continuum of possibilities, both in the perception and the action relation. Perception possesses a highly constrained selection of possible environment stimuli - ranging from simple cases like the possibility of sensing only groups of specific chemicals and to more complicated cases like the necessary limit of discrimination ability in any continuous perception spectrum (visual, auditive, tactile, etc.). In short, perception and action both possess a certain *granularity* which allows it to be pragmatically efficient at the prize of a certain imprecision. This imprecision, it is evident, implies certain limitations - larger or lesser - on the perfection of the organism-environment fit. Both more perceptual precision (which is also energetically more expensive), on the one hand, and more perceptual economy (which is also less precise), on the

other, may be favoured by selection, according to the specific conditions in the single case. In semiotic terms, this implies that in the functional circle, a tension is at stake in embodied semiosis between semiotic complexity on the one hand and semiotic economy on the other. The “perfection” discussed by von Uexküll can be nothing but a local optimum (always potentially subject to change due to environmental pressure and change) in the tension between these two possibilities in all functional-circle defined bodies. Thus, the Umwelt concept furnishes semiotics with a basic idea of a body as semiotically defined by the set of its perception and action sign possibilitiesⁱⁱⁱ – which in the right interpretation may potentially serve adequately as a biological underpinning to the often vague embodiment talk in Cognitive Semantics.

Merleau-Ponty - the body's functional circle opening up

It is well-known how Merleau-Ponty's special brand of phenomenology took its point of departure in Husserl, enriched by ethology and psychology of perception. This led Merleau-Ponty to a characteristic third position in relation to mind-matter problems where this well-known dualism and various, more or less one-sided, attempts at resolving it are rejected with reference to the primary position of bodily being and perception. Thus, both rationalism and idealism are rejected as hypostatizations of pure mind, while, correlatively, materialism and traditional naturalism are rejected as hypostatizations of pure matter. The very condition of possibility of mental or idealized structures on the one hand and pure, material objects on the other, is bodily being whose behaviour and perception form a prerequisite basis which cannot be further dissolved - cf. Merleau-Ponty's concept of “flesh” antedating both mind and matter. Unlike many other phenomenologists of Heideggerian influence, Merleau-Ponty never, however, saw such a philosophical stance as alien to science, and it is well-known how he supported this hypothesis by references to biology and psychology of perception. It is probably less well-known how he - to the end of his short life - undertook a major work to support this position by reference to central figures in different branches of biology. These reflections appeared in university courses in the latter half of the fifties and Merleau-Ponty's lecture notes from those courses have only recently (1995) been published - and they add further details precisely to his conception of embodiment. Here, Merleau-Ponty confronts a long series of biological thought ranging from German idealism (Kant, the romantics, Husserl), vitalism (Driesch), behaviourism (Watson), Darwinism, ethology (Uexküll, Tinbergen, Lorenz), and many others - reading these currents in order to interpret their results philosophically and extract the points relevant to Merleau-Ponty's own embodiment phenomenology.^{iv}

Here, I can run through only some of the main points he addresses. Referring to von Uexküll in particular, Merleau-Ponty takes care to note that the notions of an organism equipped with an *Umwelt* in which to unfold its behaviour - “comportement” - is more basic than consciousness; quite on the contrary, consciousness is but one of the special forms this behaviour takes, not unlike the claim of Peircean semiotics. The functional interrelation between organism and surroundings is prerequisite to the emergence of consciousness, not the other way around - an idea in which von Uexküll would probably agree.^v Correspondingly, with its functional definition, the *Umwelt* is not only to be found at the level of the whole organism; even a single organ could be said to have its own *Umwelt* (220) - an idea which, of course, opens the “endosemiotic” issue. The distinction is drawn between lower animals - mere functional bundles - where the *Umwelt* forms a closed set of reaction types, and higher animals who possess, thanks to the central nervous system, an internal representational mapping of the surrounding world facilitating an open *Umwelt* (225), not unlike our argument in ch. 10. Thus, higher animals have sensory organs *able to move* (cf. movable snout, eyes and ears, intertwining sensation and motion in quick perception-action searching sequences) which enable them to actively explore and inform the world (225) - this moveability of the sensory organs so to speak shortcircuits the functional circle and enables the organism to increase precision and decrease the time and space granularity of the *Umwelt* relation considerably. This implies, correlatively, the “possibilities of objects”^{vi}; the animal may distinguish its own spatial position, e.g. against gravity; this ability becomes complete only with a proper neural system of proprioception (226) facilitating feed back control of behaviour as measured against the interiorised *Umwelt* and its *Merk-* and *Wirk-*components - a proper perceptual world and a behaviour world. Only now when the body is, in itself, perceived, the perceptual world becomes possible as an oriented, represented mental map world inhabited not only by stimuli but by independent, body-like objects.^{vii}

Merleau-Ponty’s philosophical interpretation of Uexküll’s *Umwelt* concept takes its departure from his basic melody metaphor: the *Umwelt* as a melody singing itself. This image loosens the *Umwelt* from pure, actual, physical time, just like the melody it is aimed towards the future, as it cancels the priority of effect over cause, ends over means, essence over existence. The *Umwelt* thus, in Merleau-Ponty’s interpretation, acquires an *ideal* character, not in any subjectivist sense, but as general, opposed to the actuality of the present existence - the *Umwelt* is an ideal structure which, like the melody, persists over and above the vicissitudes of the single moment. Behaviour in such an *Umwelt* thus cannot be understood taken moment for moment, but only as a meaningful whole extended in time. Without being defined in actual time and space, it is thus trans-temporal, trans-spatial - almost a Platonic idea, in some

sense, but at the same time the result of a process of self-organizing schematization involving organism and environment. In higher animals, the functional cycle of the *Umwelt* loosens ever more from its immediate pursuit of teleological ends and indulges in interpretations of symbols. Merleau-Ponty thus chooses sides in Uexküll's fight against himself as to the possibility of the existence of neutral objects and the corresponding freedom in the *Umwelt*. To Merleau-Ponty, this possibility is crucial and points to the possibility of the existence of "pre-culture" in higher animals (231). Symbols point out of the immediate present to future perception, event, and action possibilities, and the action through symbols permits organisms to perform not-innate complicated action wholes.^{viii}

Merleau-Ponty's fertile reinterpretation of von Uexküll is enriched by the reflective introduction of a long series of other biological thinkers. I shall here restrict myself to those who adds to the body concept here outlined. E.S. Russell's idea of "directiveness" of organic activities is referred for its generalization of the notion of behaviour to encompass not only the "external circuit" of a body's relation with its *Umwelt* - but also the internal regulation of an organism. There is no definite limit between these two (235), and hence it makes sense to talk about bodily behaviour already during morphogenesis. This idea thus, moreover, dissolves the strict borderline between the organism and its behaviour which should be seen, rather, as dual concepts: "The body belongs to a behavioural dynamics. Behaviour is inscribed in embodiment."^{ix} Thus, the relative plasticity of behaviours is seen as an integrated property in the being of a bodily organism as such, both at the external and internal levels - pointing again towards the semiotic notion of "endosemiosis" for intra-organism semiotic processes.

Adolf Portmann's study of the outer appearance of animals becomes an important source to a beloved theme of the elder Merleau-Ponty, namely the duplicity of perceiving and being perceived - of visibility and invisibility. Parts of an animal's outward appearance may be the chance result of a local process (the shell of a snail) and is thus without interest in this respect, but other aspects of appearance (the skin of the zebra) is the result of non-local processes characterizing the whole animal and its *Umwelt* relation. Thus, these aspects have two characteristics: one, they satisfy a mimetic teleology as if there was a perceptive relation between the two - animal morphology and environment (246). But this apparent teleology, to Merleau-Ponty, cannot be primary but requires, in the first place, a certain freedom of expression which may, in turn, direct the appearance towards utility in some cases, in others not so. Thus, animal appearance has an aspect of "presentation", of existential manifestation by which the animal makes itself visible to fellow creatures (and invisible to predators, it should be added ...). In a parallel to the older Husserl's notion of "intersubjectivity", Merleau-Ponty thus introduces the notion of "inter-

animalité” as granting an ontological status to the notion of species (this idea probably may freely be extrapolated to the notion of ecosystem): an animal looks in a way which it is itself able to see (in order to be able to be recognized by specimens of its own species): “l’animal voit selon qu’il est visible” (247).^X Inter-animality thus requires the constitution and recognition of other creatures from profiles, it requires a degree of understanding of their intention types – this covering species fellows as well as typical prey and/or predators in the ecosystem of the species in question. This inter-animality must further include common aims as well as internal battles in herd-animals – so as to form the phenomenological basis of the well-known sign and communication systems often developed in such species.

The notorious pupil of von Uexküll, Konrad Lorenz, is also made the object of an interesting reinterpretation, notably concerning his controversial notion of “instinct”. According to Lorenz, an instinct is an innate action series which requires a certain environmental releaser in order to be actualized. This idea has often been interpreted and dismissed as a purely mechanistic idea, but Merleau-Ponty rejects this reading and points to the fact that Lorenz’s notions of objectlessness and *Prägung*, imprinting, entails quite the opposite. The instinct in Lorenz is objectless and it thus possesses a ceremonial, ritual excess on top of its possible function. Moreover, the phenomenon of *Prägung* shows that instinct is in many cases incomplete and requires a fill-in from the environment which implies that it entails an open orientation towards the surroundings, especially in complex cases where the actualization of an instinct is only possible with an adjoining *Umwelt* construction, with systematic world elaboration (255). This relative emptiness and openness of instincts is what enables it to become, in turn, a kernel in symbol construction: instinctive action series may be cut off from their - possible - telos and be taken to symbolize quite different phenomena in animal communication (254). Exactly the objectlessness of the instinct makes possible its imaginative reinterpretation as a basis for symbol formation.

Merleau-Ponty’s interpretation of his great master Husserl is interesting in this context. Husserl’s problem is, Merleau-Ponty argues, analogous to that of Schelling: to find a place for nature in a philosophy of reflection. Hence, two competing tendencies are to be found in Husserl. One, connected to his transcendental philosophy, sees natural objects as connected to the “natural attitude”, the attitude of innocence, characteristic of the unphilosophical observer who must unlearn this naive way of seeing in order to grasp the constitutive, phenomenological stance. The other tendency attempts to understand natural objects as pertaining to different regional ontologies, and the break with the natural attitude is an attempt also to clarify this pre-reflexive stance, in which the natural world is given to us in a passive synthesis: “Phenomenology rejects the natural attitude and, at the same time, does more

than any other philosophy to rehabilitate it.”^{xi} Nature, interpreted as consisting of pure things, is the correlate of pure consciousness, but antedating this, there is the more original, perceived and lived world, the *Lebenswelt*. This world is the world of the body - the body as the organ of the Husserlian “I can”, so to speak Husserl’s version of the sensori-motor *Umwelt* alien to the merely perceptual, action-free world supposed by large parts of the philosophical tradition since Kant. The body perceives the objects not in a detached way, but by considering the motor possibilities implied: “The object appears to me as a function of the movements of my body.”^{xii} The body is the privileged place both for my inhabiting the world of things, and, at the very same time, for my perceptions. (107). The body is, as always in Merleau-Ponty, subject and object at one and the same time: the world of things is part of my body. (108) The body is the zero-point of orientation, not only in space-time, but in all normative scales: it is thus the body which founds the very idea of normativity.

As to the existence of other bodies, I grasp them by an *Einfühlung* which is basically corporeal (109): I perceive them as perceiving bodies before I perceive them as thinking, and the latter idea presupposes the former. This bodily relation with other bodies is indispensable for the possibility of the thought of pure things: it is only now that the pure object can be defined as a thing to which other bodies have virtual access: this “intercorporité” (109) defines the very access to pure objects. (cf. Dan Zahavi’s discussion of intersubjectivity as object constitutive). It is in this relation that I pass from prehuman to human, Merleau-Ponty claims, anticipating Tomasello’s “shared attention”-hypothesis (even if it remains unclear exactly how this “intercorporité” differs from the “inter-animalité” of animals which also possess the ability for empathy).^{xiii}

But this reference of the universe to the body and to humanity, does that not overlook that life might disappear? and what would, in that case, be left? (111). This possible disappearance, Husserl claims, would not entail that the evidence of references would appear, so we must assume a mute world would remain even in that case. Thus, in *Ideen II*, Husserl may define nature as that to which I have an original and primordial relation “... le seul unique monde pour tout le monde” (112) – the only world for everybody in the world - as Merleau-Ponty jestingly puts it.

Merleau-Ponty remarks the constant tension between this idea and the idea of the break with the natural attitude which it presupposes, and he concludes by saying that Husserl never really resolved this tension which he implicitly admitted, e.g. in his double concept of constitution (constitution “par actes”, through conscious acts, on the one, anti-naturalistic side, and “latente”, on the other, naturalistic side, 112). Obviously, Merleau-Ponty ontologically prefers to underline the latter, pertaining to the “passive synthesis” while, at the same time, maintaining the methodological necessity of the transcendental “epokhe” of the former.

All in all, the body concept in Merleau-Ponty's reflections on nature has the following characteristics:

It refers to future possible states and thus transgresses the pure actuality of physics - and at the same time points to "real possibilities" as having ontological existence (cf. Peirce's insistence on exactly that notion)

It is prerequisite to both the subject and object category.

It has a primary sensori-motor relation to the world, forming an integrated complex of Umwelt and behaviour.

It has the possibility of transgressing its own finality in behaviour with an "open" side facilitating mere expression and symbol use - already in the case of higher animals which thus possess the germs of culture.

Merleau-Ponty, furthermore, envisages the need for the transgression of the body concept in both up- and downwards directions, so to speak: he admits the possible Umwelts even of single organs (and cells?) on the one hand, at the same time as he locates the animal in an "inter-animality" anticipating intersubjectivity.

In comparison to the body concept of Cognitive Semantics, Merleau-Ponty lays the same stress on the primacy of the sensori-motor entanglement of the body, on its gestalt competences, and its imaginative abilities - and in rare moments, the cognitive semanticists also count Merleau-Ponty as a forerunner, if not inspirator. In addition to Cognitive Semantics, Merleau-Ponty, with his Uexküll and related references, extends his body concept to cover higher animals as well, while the specificity of the human body comes into play along with language, intersubjectivity and the appearance of pure objects (even if his notes are not unambiguous on this point - the access of higher animals to neutral objects must provide an important step towards pure objectivity, just like the notion of "inter-animalité").

Complexity theory - "autonomous agent" as a formal body definition

A recent tradition of thought with huge implications for theoretical biology is the so-called "complexity theory" of the "Santa Fe school" (Murray Gell-Mann, Brian Arthur, David Pines, et al.) finding formal regularities of complexity in all domains where a manifold of interacting entities are at play: from solid state physics over biology to economics and sociology. Especially the work of Stuart Kauffman is of interest in our context; even if his work does not contain explicit reflections on the body concept, such reflections can be easily inferred from his general discussion.

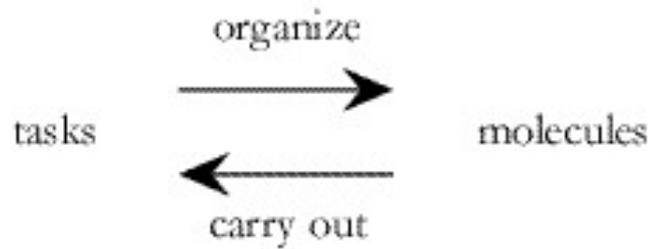
He takes his beginning point in the Darwinian idea of the origin of life in a biological "primordial soup" of organic chemicals and investigates the possibility of one chemical substance to catalyze the reaction of two others,

forming new reagents in the soup. Such catalyses may, of course, form chains, so that one reagent catalyzes the formation of another catalyzing another, etc., and self-sustaining “loops” of reaction chains is an evident possibility in the appropriate chemical environment. A statistical analysis shows that such catalytic reactions may form interdependent networks when the rate of catalyzed reactions per molecule approaches one, creating a self-organizing chemical cycle which he calls an “autocatalytic set”. When the rate of catalyses per reagent is low, only small local reaction chains form, but as the rate approaches one, the reaction chains in the soup suddenly “freeze” so that what was a group of chains or islands in the soup now connects into one large interdependent network, constituting an “autocatalytic set”. Such an interdependent reaction network constitutes the core of the body definition unfolding in Kauffman, and here, as in Uexküll, its cyclic character as the basic precondition for self-sustainment must be noted. He now defines an “autonomous agent” - a sort of general, formal organism concept - as follows. An autonomous agent is an

“Autocatalytic set able to reproduce and to undertake at least one thermodynamic work cycle” (49) (- defined, in turn, as the recurrent release of thermal energy for performing mechanical work)

This definition implies two things: 1) reproduction possibility, and 2) the appearance of completely new, interdependent goals in work cycles. The latter idea requires the ability of the autocatalytic set to save energy in order to spend it in its own self-organization, in its search for reagents necessary to uphold the network. These goals evidently introduce a - restricted, to be sure - teleology defined simply by the survival of the autocatalytic set itself: actions supporting this have a local teleological character. Thus, the autocatalytic set may, as it evolves, enlarge its cyclic network by recruiting new subcycles supporting and enhancing it in a developing structure of subcycles and sub-sub-cycles. This has its exact analogy in economy, Kauffman argues: in 18 Century England, coal-fired pumps were employed to empty the coalmines for water - and thus made possible more efficient coalmining and industrialization as a whole. Again, we recognize the Kantian description of teleology by locally self-sustaining cycles.

Now, Kauffman proposes that the concept of “autonomous agent” implies a whole new cluster of interdependent concepts (forming so to speak, in itself, an autonomous agent network on the conceptual level ...). Thus, the autonomy of the agent is defined by “catalytic closure” (any reaction in the network demanding catalysis will get it) which is a genuine Gestalt property in the molecular system as a whole - and thus not in any way derivable from the chemistry of single chemical reactions alone. Tasks and molecules constitute, on this level, a duality:



The work definition here concerns the *governed* release of energy with respect to a task. Thus “organization” becomes the set of constraints pertaining to an energy release process in the system. To the conceptual cluster around “autonomous agent” thus also belongs: the emergence of organization consisting of entities measuring relevant properties of nonequilibrium systems in the environment, identifying sources of energy that can perform work. This requirement is, as is evident, co-extensive to what we normally call perception and action - the search for, identification of, digestion of, and putting to use energy sources in the environment (83). Thus, also all of the following concepts pertain to one and the same conceptual network defining an “autonomous agent”: Work, constraints, construction, measuring, energy, information, event, organisation (as *closure* of the set of possible molecules, of catalytic tasks). Thus, semantics is first of all defined by teleology - in an autonomous agent, chemical agents (or to be more precise, specific molecular configurations on the surface of macromolecules) can become signs.^{xiv}

It is interesting to note that Kauffman’s definitions on the basis of speculative chemistry thus entail not only the Kantian cyclic structure, but also the primitive perception and action phases, of Uexküll’s functional circle. Thus, Kauffman’s definition of the organism in terms of an “autonomous agent” basically builds on an Uexküllian intuition (even if there is no reference to von Uexküll), namely the idea that the most basic property in a body is metabolism: the constrained, organizing processing of high-energy chemical material and the correlated perception and action performed to localize and utilize it - all of this constituting a metabolic cycle coordinating the organism’s in- and outside, defining teleological action. Perception and action phases are so to speak the extension of the cyclical structure of the closed catalytical set to encompass parts of its surroundings, so that the circle of metabolism may only be completed by means of successful perception and action parts.^{xv}

Of special semiotic interest are certain corollaries to the concept of “autonomous agent”. Environment perception must, for economical reasons, be semiotic. One aspect of this is the fact that perception must coarse grain the environment and seek information on a certain level of stimulus dissolution. Biological evolution makes perception tend towards an optimal coarse graining of environmental information. Another aspect is that “usefulness” of an object in relation to a given agent only pertains to a few properties - just like a few

properties then may play the role of signs for their useful objects. The useful properties and the sign properties may, in many cases, coincide (giving a high degree of interpretational security), but in other cases, the sign properties may merely overlap or even differ highly from the object properties which are sought after, introducing an arbitrary aspect of such signs. A third semiotic constraint in the concept cluster surrounding the autonomous agent concept is the fact that as we – as any other autonomous agent – are unable to overview the configuration space of the biosphere and search for regularities therein. The space of all possible biological species is so enormous that it is impossible to access directly in any rational way (and much worse, then, the space of all possible interspecies relations which is larger than $2^{\text{number of species}}$). This necessitates *storytelling* as the only way to access general knowledge about typical event series - storytelling here ranging from innate action sequences which have proved useful for survival, over acquired knowledge about typical event sequence structures in environment interaction, and to human explicit narrating. Narratology thus, analogous to our argument in ch. 9, becomes an a priori consequence of the vastness of biological configuration space and the a priori impossibility of access to that space. The autonomous agent furthermore introduces the distinction ought/is, correlative to the distinction between task functions and effective causes in an organism, while on the other hand the physical distinction between laws and initial/boundary conditions is relativized by the circularity and growth potential of the agent. Stephen Jay Gould's well-known notion of exaptation^{xvi} also stems from the inability to access biological configuration spaces: no finite list over biological functions can be predetermined. Thus, invention refers to new combinations of select properties among the indefinite number of properties of a system.

The evolution of autonomous agents are taken as the empirical basis for the hypothesis of a general thermodynamic regularity based on non-ergodicity: the Big Bang universe (and, consequently, the biosphere) is not at equilibrium and will not reach equilibrium during the life-time of the universe. This gives rise to Kauffman's idea of the "adjacent possible". At a given point in evolution, one can define the set of chemical substances which do not exist in the universe - but which is at a distance of one chemical reaction only from a substance already existing in the universe. Biological evolution has, evidently, led to an enormous growth of types of organic macromolecules, and new such substances come into being every day. Maybe there is a sort of chemical potential leading from the actually realized substances and into the adjacent possible which is in some sense driving the evolution?^{xvii} In any case, Kauffman claims the hypothesis that the biosphere as such is supercritical in the sense that there is, in general, more than one action catalyzed by each reagent. Cells, in order not to be destroyed by this chemical storm, must be internally subcritical (even if close to the critical boundary). But if the biosphere as such

is, in fact, supercritical, then this distinction seemingly a priori necessitates the existence of a boundary of the agent, protecting it against the environment. Kauffman does not go deeply into this, but it is, as a matter of fact, an a priori argument for the existence of cell membranes, skin, fur, plate, etc.

To sum up, the body understood as an “autonomous agent” has the following implications:

- It defines a conceptual cluster involving reaction chains forming a loop in autocatalytical closure, emergence of organization, perception, action, work, constraints, construction, measuring, energy, information, event, organisation, semantics, teleology.^{xviii}
- Thus, the birth of meaning, signs, and intention supposedly take place alongside the self-organization of autonomous agents.
- Narration and story-telling are necessary in the absence of access to the configuration space of autonomous agents and their interrelations.
- The body boundary is implied by the necessity of the sub/supercritical distinction.

In relation to biosemiotics, it is crucial to note that the definition of autonomous agents takes the body concept all the way down to cell level (and maybe below as a limit case, cf. “autocatalytic closure”)

Biosemiotics - a natural history of embodiment

Biosemiotics, as discussed in the previous chapters, has emerged as a semiotic project during the last decades, involving the initiative of the late Tom Sebeok, and, among others, the Copenhagen school (Jesper Hoffmeyer, Claus Emmeche), of which I consider myself a sort of fellow traveller.

I can not run through the whole set of ideas of Hoffmeyerian Copenhagen biosemiotics here, and many of them have been repeated through the previous chapters, but let me sum up some of its basic assumptions. Independently of Kauffman, biosemiotics sees the cell as equipped with a point-of-view - defined as a “stable integration of self-reference and other-reference” (Hoffmeyer) - and like in Merleau-Ponty or Kauffman, this does not necessarily imply the presence of consciousness. This definition refers to the self-description by genetic means on the one hand, necessary to pass on the information about the stable structure of the body to the next generation, and, on the other, to the stable representation of the outside within the cell, due to its system of “perceptions” facilitated by specific chemical receptors. The self-description, in turn, is double, due to life’s “code duality”: the digital DNA representation is not the only information inherited, and it is certainly not, as it is often maintained, the only “cause” of the phenotypical organism. The whole

cell structure with different organelles constitutes an additional “analogue code” which is inherited directly (some of the organelles may even have their own DNA) in the egg cell.

Membranes are seen as crucial in biosemiotics because defining the inside/outside distinction characterizing all life forms, facilitating the highly constrained traffic across this boundary in the form of signs (perception can, then, be rephrased as “inner outsides”, just as action changing the surroundings into a specific ecological niche can be rendered as “outer insides”). Moreover, internalized membranes of many different sorts facilitate semiotic processes inside the cell, regulating metabolism. Likewise, in higher animals, internalized skin sensors might have given rise to the part of the important part of the nervous system performing proprioception.

The simplest semiotic process is categorical perception, or environmental granularity (already at biochemistry level) - thus biosemiotics finds the semiotic vocabulary indispensable to describe even biochemic reactions - that is, when they take place in the context of the cell’s metabolism. “Scaffolding” is a concept invented by Hoffmeyer for the general process of stabilizing, channeling, automatizing and sophisticating (by adding new stable possibilities) a segment of metabolism: ranging all the way from cell architecture, organ structure, and to nest building, herd behavior, language, writing. In Hoffmeyer, increasing “scaffolding” implies the converse notion of “increasing semiotic freedom” - higher animals may not only be able to recognize tokens as instantiations of types, but also use these, apart from their possible reference to the immediate surroundings, to symbolize, to play, to reason, to argue, to use diagrams. This bodily basis even permits sufficiently complex organisms to make abstractions by treating relations as a thing (metaphorically) - probably only humans are able to do this explicitly and at will.

Biosemiotics in general thus points to the necessity of defining the body concept in constant interaction between biology and semiotics: the body as the minimal biological entity simply *is* a sign processing device. The evolutionary stance of biosemiotics, moreover, urges it to try to define a series of differently abled bodies so that the ability to specific sign use is correlated to a type of body^{xix} – attempting to charting a “natural history of the sign” (Hoffmeyer).

Umberto Eco originally proposed the idea of a lower threshold of semiotics, presumably distinguishing human language and sign use from simpler signal systems in biology. This idea has, of course, been challenged by biosemiotics finding instead a crucial threshold between inorganic and organic nature - cf. Sebeok’s idea of biology and semiotics as co-extensive. Thus the idea emerges that the crucial task is not to find one lower threshold of semiotics but rather to establish a whole ladder of thresholds of increasing biosemiotic complexity. In addition to thresholds separating the inorganic from the organic

world and animals from human beings, we may expect semiotically defined thresholds separating unicellular from multicellular organisms, plants and fungi from animals, animals with/without central nervous systems and correlated environment representations - and probably many more. As we saw in ch. 11, Terrence Deacon argued (1997) that the semiotic “missing link” is the transition from iconic and indexical to symbolical signs; a problem here is that if we use Peirce’s symbol definition, many higher animals use symbols. Maybe the semiotic missing link is constituted by several subthresholds lying close to each other and yet await untangling? - the ability of diagrammatical reasoning is probably also shared by some higher animals, the use of metaphor likewise, the existence of intersubjectivity and, correlated, objectivity arguably has its primitive form in Merleau-Pontyan “inter-animalité”. The use of the special symbol type of argument can also, presumably, be found in many higher animals. As we saw, the best candidate for the semiotical missing link might be a special subtype of the Peircean symbol: the so-called “hypostatic abstraction”, making of some aspect or relation of a phenomenon a new, explicit object. This would be the ability to make signs, arguments, symbols *explicit* and thus subject them to deliberate control and change – and hence facilitating their fast development in culture.

In any case, one of the tasks of biosemiotics must be the construction of a semiotical ladder of evolution, combining basic body types with semiotic ability. Below follows, as a conclusion to the last four chapters by way of proposal^{xx}, a first outline of such a scale with some of the single steps nicknamed after central authors.

A biosemiotic Scala Naturae

<i>Searle threshold</i> - conscious, deliberate, intentional communication actions - linguistics
<i>Eco threshold</i> - linguistics and other human sign systems - humanities
<p>the “biosemiotic missing link” - probably consisting of several sub-thresholds?</p> <p><i>Deacon threshold</i> - symbols? <i>Lakoff threshold</i> - metaphors? (- but is there any clear limit between metaphor and concept extension?) <i>Husserl threshold</i> - intersubjectivity? <i>Tomassello threshold</i> – joint attention? hypostatic abstraction?</p>
<i>Merleau-Ponty threshold</i> - multicellular bodies with central nervous system (and probably consciousness), symbol processing, “interanimalité” and environment mapping - higher zoology
<i>Uexküll threshold</i> - active information gathering, functional circle - zoology
<i>Lynn Margulis threshold</i> between unicellular and multicellular organisms (plants, funghi, animals) - pertaining to the introduction of stable intercellular semiosis and cell differentiation ?
threshold between prokaryotes and eukaryotes where the DNA in the former is not yet separated from the protoplasm so that it may much more freely be communicated to other prokaryotes ?
<i>Sebeok threshold</i> – semiotic processes proper - biology
<i>Peirce “threshold”</i> - protosemiotic processes - all of the universe

ⁱ A problem here, though, is that there is hardly any definite boundary separating metaphorical projection from concept extension (both refer to the application of a concept on

hitherto uncovered domains). The difference lies in the domains rather than in the extension process.

ⁱⁱ The grasp of this problem depends on the understanding of “a priori reasoning”. If it is to be taken in the Kantian tradition where a priori refers to validity prior to any empirical knowledge as well as to evident givenness for any knowing subject whatsoever, it is clear that the CS tradition is right in refusing to indulge in a priori reasoning, cf. ch. 8.

ⁱⁱⁱ See ch. 10.

^{iv} Doing so, Merleau-Ponty follows the example set by Ernst Cassirer - philosophizing by sifting the results of the special sciences - rather than that of Heidegger and his irrationalist claim that the “Wissenschaft denkt nicht”. There are more references to Cassirer than to Heidegger in *Phénoménologie de la perception*.

^v Despite the idea that the *Umwelt* is a subjective construction on part of the organism, von Uexküll’s position is not necessarily subjectivist in the sense that it is a construction taking place in the organism’s consciousness. von Uexküll’s methodology for *Umweltforschung* was, in fact, a sort of behaviorism: an animal’s *Umwelt* should be investigated by observation of its anatomy and its interaction with its surroundings, rather than through any sort of empathy.

^{vi} Merleau-Ponty thus does not hesitate to solve von Uexküll’s problem with the possibility of “neutral objects”: higher animals with central nervous systems do, in fact, access such objects, cf. below.

^{vii} This idea anticipates René Thom’s idea that environment objects are prototypically conceived of as a sort of generalized “animals” so that nouns in general refer to such animal-objects.

^{viii} In this idea, Merleau-Ponty’s concept of symbol approaches the Peircean symbol, being defined by its *esse in futuro* and its ability to anticipate future action by incarnating habits. At the same time, moreover, Merleau-Ponty anticipates Terrence Deacon’s fertile idea of symbolicity as a crucial threshold in evolution, cf. the previous chapter.

^{ix} Translations from *La nature* are mine. “Le corps appartient à une dynamique de comportement. Le comportement est enlisé dans la corporéité.” (239)

^x This importance of animal appearance not only goes for its relation to species mates and to predators, it must be assumed, but also in relation to other species with which it competes, enters into symbioses, etc.

^{xi} “La phénoménologie dénonce l’attitude naturelle et, en même temps, fait plus qu’aucune autre philosophie pour la réhabiliter.” (104)

^{xii} “La chose m’apparaît comme fonction des mouvements de mon corps.” (106).

^{xiii} Do animals hunting in flock not possess a sort of shared attention? Maybe not at any conscious level as known from human learning, but still several stages during the evolution from inter-animality over inter-corporality and to intersubjectivity seem to await proper conceptual determination.

^{xiv} Without explicitly talking about the a priori of regional ontologies, Kauffman thus makes a parallel argument to our charting of a conceptual cluster of biosemiotics in ch. 9.

^{xv} It is an interesting and strange implication of Kauffman’s work (which it shares with the organism definitions of much romantic *Naturphilosophie*) that this cluster of concepts defining an autonomous agent may not stay a privilege for biology as we know it (geomorphology in geology, galaxy clusters in astronomy, companies in economy, states in international politics, etc. may be other candidates for autonomous agents in Kauffman’s definition) – cf. our related discussion in ch. 9.

xvi Referring to the putting to use of a biological property for another purpose than that for which it originally evolved.

xvii This idea forms Kauffman's suggestion for a fourth thermodynamical law - the universe invades the "adjacent possible" with the highest possible speed. It remains unclear, though, against what this "highest speed" could be measured.

xviii What Kauffman calls "clusters of concepts", Husserl would probably call a regional ontology of a priori concepts for any possible biology.

xix When I have presented this idea in lectures, it has been challenged by distinguished semioticians, like Susan Petrilli and Lucia Santaella, on Peircean grounds. They claim that Peirce's metaphysical continuity prohibits such thresholds from having any ontological value. I would argue this is a fallacious argument. It is perfectly possible to maintain a basic continuist ontology and at the same time search for discontinuities segmenting this continuum. This lies already in one of Peirce's basic arguments for the primacy of continuity: the continuum problemlessly includes discontinuities, vice versa not so (and all attempts at "building" the continuum from discrete entities fail). Moreover, even when no apparent discontinuity is at stake, clear differences are possible (take e.g. the continuum of color which does not imply that there is no difference between, say, yellow and green, having each their prototype (cf. Berlin and Kay's classic investigation of colour names)). A sharp demarcation between any two colors will possess a certain arbitrariness but still it will possess a *fundamentum in re*. It is important not to let continuity assume a role of thought prohibition, a new darkness in which all cows become grey. This would violate Peirce's basic motto: Do not block the way of inquiry.

The biosemiotic Scala Naturae may be conceived of on the basis of Gould's idea of "punctuated equilibrium". Even if evolution is basically continuous, it may be segregated into long periods with little change, separated by short periods with huge changes. Thus, the development of man's unique semiotic possibilities have taken place over a very short timespan on an evolutionary scale, and it may be possible that the same thing holds for the passing of some of the other biosemiotic thresholds.

^{xx} Some of the thresholds proposed may cross each other, e.g. some of the candidates for "missing link" thresholds, or the "intercellular" threshold and the "Uexküll threshold".