ABSTRACT BOOKLET

14th Gathering in Biosemiotics

The importance of non-gradualism in a biosemiotic theory of adaptation
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Many celebrated cases of butterfly mimicry appear to be hopeful monster phenomena, not the products of gradualism (Alexander, 2001; 2010; forthcoming). The evidence (Dasmahapatra, 2012) is now clear a favorite example of mimicry involving *Heliconius* arose suddenly not gradually, and this may be true of the viceroy, *Limenitis archippus,* and the deadleaf, *Kallima inachus,* as well*,* According to this non-gradual view, the resemblance of the mimic to another form may initially be a remarkable coincidence, not the product of countless interpretive responses of predator-prey relations. Only later does interpretive selection pressure aid in the retention and spread of these amazing forms. Could it be true that most new signification arises non-gradually in this manner?

My inspiration in this field comes from the world's most famous lepidopterist, Vladimir Nabokov, who, it turns out, may actually have some loose intellectual ties to the precursors of biosemiotics. His mentors at Cambridge were William Bateson (a non-gradualist and Gregory's father) and Reginald Punnett, who led Nabokov to Richard Goldschmidt, whose work, showing small changes can lead to large differences, bears relation to René Thom's catastrophe theory.

In this paper I will work toward integrating false mimicry with biosemiotics, focusing on the possible importance of non-gradual change in meaningful adaptations. I suspect that false mimicry may be key to novelty. At every biological level, morphologies that are coincidentally like familiar signs—that accidentally mimic them—can become new signs of different useful processes, resulting in the rapid emergence of more complex and organized behavior. While natural selection explains how certain structures become more prevalent than others (they survive to reproduce while others do not) biosemiotics can explain how organic systems are able to interface with their environments in the first place, such that selections for new self-sustaining responses are possible. Thus mimicry may be more appropriately recruited as the poster image for biosemiotics than for Darwin's gradual selection theory.

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Dissolving boundaries in space and time: Couplings between exuberant environments and distributed organisms

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This paper explores sundry contemporary stagings for Hutchinson's “ecological theater” and “evolutionary play”, inquiring how we digest and express the ways in which both the space of the theater and the time of the play challenge our habits of scientific thinking and communication, themselves saturated with linguïculture. Some cosmologies have subscribed to a model of our blue marble atop a stack of turtles; Stephen Jay Gould described genealogies in biology as bushes all the way down. Coming into better focus of late, all biological parties and processes dance in calculi of interpolations, drags, anticipations, the pushes and pulls of centrifugal and centripetal forces—these standing for Monod's “necessities”—subjected to liberal doses of serendpity for his “accidents”. I take the necessities to inhabit Salthe's suspenseful developmental space-time, and accidents to exemplify the corresponding unpredictable and surprising evolutionary emergences.

In sum, neither organism nor environment are stable features but rather dynamically coupled in relational ecologies. Such promiscuous couplings form the infrastructure for emergence, continuity, and change that may maintain conditions for an overarching biosphere. Moreover, as we come to better grasp the genres of epigenesis, time figures with greater elasticity than can be crisply described. Epialleles may arise under perturbation, and be captured under heritability, leading some to recall Lamarck's inheritance of acquired characteristics.
Lip service has been paid to these varied semiotic observations, but our language lags, even as scattered evidence accumulates.

Semiotics can and does align with many contemporary concerns of posthumanity, of embodied mind and mindful body, at the level of organism. The expectation of “units of analysis”, though, reflects the particular genre of Indoeuropean language dominating this discourse. English tends to foreground nouns, and to “thingify” processes. This is an observation, not pointing to any “solution”, but rather inviting still more perspectives.

Yet, already a century ago, both philosophers (e.g., Mead 1913) and empirical researchers (e.g., Duchenne de Boulogne 1862) surmised, with respect to humans at least, that the organism's supposedly inner states interface with the extra-organism environment in tangled processes, rendering any separaration one of linguistic habit. Here I recall Hutchinson's assertion that the fundamental question of science, not just of biology, at the close of the last century was “insides and outsides” (Anderson 2000).

Evidently, both “insides” and “outsides” are replete with inviting and disuading “receptors” and other sites that might leak or absorb, all making consolidation on either side provisional, and ongoing approximation, a hypothesis. In space, membranes both contain and connect, relating content and context, while cells may

send as well as interpret the same molecule. The imaginable juncture in time between inhaling and exhaling sets the stage for the next cascade.

Using orchids to teach DNA sequencing, phylogeny and biosemiotics: ladders with many steps

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Students find genetics lab particularly difficult and biosemiotics a great mystery, if they think of it at all. Through the study of orchids, however, we three teachers (two from the genetics section of Biology, myself as teaching director of an American Orchid Society judging center) have engaged them in an exciting study of orchid taxonomy, from gathering samples, to morphology, holomorphy, and finally "barcoding", which is classification according to genetic sequencing. The genus *Gongora* (Orchidaceae) shows extensive morphological affinities, which result in mislabeling in botanical collections. The use of DNA barcoding as an additional tool of species identification would greatly aid in the classification process, as well as in clarifying the evolutionary relationship between species examined. Such use would therefore facilitate classification of unknown species (Singh, 2012). Using sequences from *trn-H-psbA, rpoB, rpoC1* and *matK,* 24 students developed phylogenetic trees for ≈30 disparate species of orchids; we then examined ≈ 32 of the 75 putative species of *Gongora* with a select group of five students. At the same time we were forming them to examine the interrelations between the phenotype, genetics, and interspecific activities, notably fungus and insects in the life cycle of orchids, thus revealing biosemiotic principles at work. We faculty developed this project as part of a guided research project that took place in the Genetics Laboratory of Fall and Spring 2013. The ladders refer to both the method used in electrophoresis and the cross-disciplinary nature of the work.

On neurons and phanerons. Charles S. Peirce and the laws of mind

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Every zeitgeist has its own scientific "Geist", and ours seems to be the mergence of natural sciences and humanities to overcome complex scientific challenges. One of the particularly lively common fields of this fascinating endeavor is the ongoing research projects on Brain/Mind, as the setting of human activity center both on biological and cognitive levels.

The beginning of the 1890s, the years in which Charles S. Peirce published his articles concerning the laws of mind, Brain and Mind research was marked by two significant works: *Manual de Anatomia Pathologica General* by Santiago Ramón y Cajal – the receiver of 1906 Nobel Prize in physiology - and the *Principles of Psychology* by William James, a groundbreaking work in the field of Psychology. Whereas these two outstanding scientists had just started to define the outlines of two new scientific disciplines which as we know would later have huge impact on the modern world, namely neuroscience and psychology, Peirce focused his scientific investigations on mind and brain activity on developing a methodological setting by

merging the insights achieved by the biological studies concerning the neural activities with psychological studies concerning the cognitive activity of the mind. As is well known, Peirce's interest in human nature was wide and he contributed notably to the study of various psychological problems; in particular, to the problems relating to sensation, materiality and the psychology of perception. He was certainly not an amateur in these fields, but was profoundly acquainted with the development of psychology and criticized its existing divisions of introspective, experimental and physiological psychology. Instead, he proposed a *physiological* psychology that should work commodiously with the exploration of the brain and its connections. He considered the psychological theories derived from the study of the anatomy of the brain of great value, as long as it was the conscious mind that was studied.

The aim of the following paper is to discuss Peirce's contribution for solving methodological challenges to integrate natural and human sign-systems. It is an attempt to approach the human brain activity by the tools of Peirce's *Laws of Mind* focusing primarily on neural and reasoning activity structures as two formally distinct and yet in their processing as remarkably coherent sign systems.

Turtles really are not just armoured machines
Jindřich Brejcha and Karel Kleisner, Charles University

Communication on various levels of complexity of organisms has been extensively studied for a long time. 'Higher' cognitive and behavioural faculties, such as aesthetic perception, complex vocalization, play, and altruism, however, have traditionally been ascribed mainly to birds and mammals. In reptiles, these processes have only been recognised in the last couple of decades. In our paper, we review some recent findings pertaining to various highly developed behavioural and cognitive patterns with special focus on turtles. Traditionally, turtles have been seen as basically just silent armoured machines with complex physiology but no altruism, maternal care, or aesthetic perception. Nowadays, we witness a radical change in appreciation of turtle behavioural and cognitive skills. New evidence points to the existence of purposeless play, vocalization between individuals linked with maternal care, sharing acquired experience, altruistic behaviour between captive specimens, etc. In our contribution, we present preliminary empirical evidence which indicates a link between turtle coloration and sexual behaviour. We suggest that alternate presence of conspicuous coloration and courtship behaviour in turtles may represent a kind of evolutionary trade-off between display costs and perceivers' cognitive skills.

Can biosemiotics be a 'science' if its purpose is to be a bridge between the natural and social and human sciences?
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In Barbieri's latest argument for leaving Peircean biosemiotics and creating an alternative code-biology the definition of what it means to be scientific plays a major role. But he is also suggesting a new "scientific" way of dealing with the concepts of meaning. For Barbieri "scientific knowledge is obtained by building machine-like models of what we observe in nature" – "Mechanism, in short, is virtually equivalent to the scientific method." Barbieri then introduces a concept of biological meaning

that is separate from the semiotics he is creating as the foundation for his code-biology: "Semiotics, therefore, is not just the study of signs; it is the study of signs and meanings together". This is an interesting counter move to a Peircean pragmaticist conception of fallibilist science based on a metaphysics of Tychism, Synechism and Agapism. One problem is to define science from one method as the only way to work towards truth, like Descartes attempted; the other problem is that mechanical models cannot encompass interpretation and meaning; the third is the introduction of a pre-interpretation biological meaning: "… meaning is a mental entity when the code is between mental objects, and an organic entity when the code is between organic molecules." This leads him to postulate "two distinct types of semiosis in life, one based on coding and one based on interpretation." But as far as I can see, interpretation is not "scientific" as we cannot make mechanical models of it. But nevertheless Barbieri uses a concept of meaning as part of his code biological paradigm! I wonder where he gets it from, because he does not define it anywhere in his writings, though it is tied to his semiotics. He writes: "A sign, to start with, is always linked to a meaning. As living beings, we have a built-in drive to make sense of the world, to give meanings to things, and when we give a meaning to something, that something becomes a sign for us. Sign and meaning, in other words, cannot be taken apart because they are the two sides of the same coin." But he does not go into how signs come to give meaning for us and living systems in general, suggesting, instead, that "the cell is a code poietic system". But there is no meaning concept in autopoietic theory's cybernetic basis. It seems to me that Barbieri's mechanistic approach to science contradicts the part that attempts to develop a science of meaning and interpretation. Thus, it seems clear from his defining mechanism as the model scientific method that there are no qualitative sciences. Consequently phenomenology, hermeneutics, discourse analysis, cognitive embodied linguistics, and pragmatic linguistic and Peircean semiotic explanations are not a part of his concept of science. His code biology is therefore unable to produce the evolutionary transdisciplinary bridge between the natural, life, social and human "sciences" which is immanent in the biosemiotic project. Code biology is too narrow in method and ontology. In my opinion this is why we have to embrace Peirce's pragmaticist semiotics instead.

Can we can talk about 'smartphone addiction'? More steps towards the biosemiotics' exploration of digital culture.

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The past five years have seen the use of internet-enabled mobile phone devices or smartphone, skyrocket in most parts of the world. Expressions such as 'Twitter revolution' in relation to the 2009 Iranian election protests and in the 2010 Arab Springs show that social media, as accessed through mobile phones, have been seen as communication tools that are vital for the betterment of society and the pursue of democracy. However the use of social media through smartphones during riots could also be read in a different and more politically disillusioned way, that is, as the difficulty that people have in controlling their compulsive mobile phone use, even in a potentially life-threatening situation such as a riot. If this is not the most orthodox example to introduce the idea of compulsive smartphone use, then perhaps referring to a typical situation encountered in the contemporary classroom might be. The question that I have asked more often in the university classroom during the current

academic year is “Can you put your mobile away, please?”. Students’ incapacity to ignore their phones even when asked to do so several times, raises (in addition to the usual musings on poor students’ conduct) the following questions: what is in a smartphone that triggers compulsive behaviour? Can one actually talk of smartphone addiction?

This paper sets out to look into smartphone ‘addiction’ from the point of view of biosemiotics. The aim is to make biosemiotics’ natural-cultural approach relevant to cultural analysis, represented in this case by the cultural object of the smartphone. Not much literature has been published on smartphone addiction, although the web abounds with articles on the topic. However, there is plenty of published literature on technology addiction. This focusses on work and email addiction, internet addiction and gaming addiction. Across these areas, there emerge three approaches to technology addiction 1) the one claiming that technology addiction exists as a medical condition and that can and should be treated (Porter and Kakabadse 2006; Rosen 2012), 2) the one arguing that behavioural addiction cannot be put on the same level as substance addiction and that one should instead refer to technology ‘overuse’, ‘excessive use’ or even ‘compulsive use’ (Watkins 2009; Greenfield 2011) and, 3) the one not looking at whether behavioural addiction exists or not, instead looking at how discourses of technology addiction are created through metaphors, narratives, online testimonies, and so on (Umiker-Sebeok 1997).

This paper will try to situate its argument against one (or more) of the above positions by proposing a semiotic analysis of the ‘addictive properties’ of the smartphone. It will do so with particular reference to the universal constraints that the phone’s operating system’s (OS) software puts on the behaviour of its users. The hypothesis is that the communicational strategy that triggers the compulsive use of the phone (i.e. the constant phone-checking), is grounded in what Sebeok identified as nonverbal communication (2001). In fact, the push notifications sent to the front page of the phone by the OS software are indicative signs with orienting function (i.e. go and check your new message NOW) that are difficult not to obey. This is possibly because such signalling taps in to human being’s instinctual capacity to be oriented by nonverbal communication, in other words, by primary modelling systems (Sebeok and Danesi 2000).

Overall, the final aim of this paper is to outline the constraints of the goal-directed behaviour that has been programmed into smartphones, considered, borrowing Sharov’s terminology, as nonhuman or artificial agents (2011). This is done with the view to insert critical mobile phone use amongst topics of note in new media literature.

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Peirce and Bateson: The pattern that connects

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The purpose of this paper is to explore the connection of the fundamental concepts that underlie Peirce and Bateson. It is typical of many researchers to begin their explanation of Biosemiotics with high level examples of the semiotics of a slap, a rash of red spots or visible smoke. A question that arises is whether these high level examples are sufficient to convey the fundamental nature of Biosemiotics as the "study of living systems that takes the production, exchange, and interpretation of signs to be constitutive for life" (Hoffmeyer, 2010). An observation that may be made is that there is a process of learning that is implicit in all of these examples. But, what is that process of learning? Does that process of learning include Peircean triadic thinking, or not? Can it be generalized so that any process of learning implies Peircean triadic thinking? What does Bateson have to do with this process of learning? How can we explain how this comes about by using low level or basic examples? Is there a more basic approach that can be used to arrive at high level examples? Or, are we limited only to high level examples? Is there really a need to come up with a basic explanation of semiosis? Does a low level explanation add anything to this picture? Does this allow a difference that makes a difference to be made that is of interest to anyone?

An attempt at answering some of these questions begins by recognizing that the basic unit of existence is a homeostatic organism in interaction with its environment. The environment includes other organisms that may exist in said environment, and the realization that to any given homeostatic organism other organisms are just part of the environment. Once these homeostatic organisms come into being they are subjected to, what may be described as, sensorial maps of the ever-present environment that are discernible to said homeostatic organisms. A sensorial map is defined as a recognizable distribution of matter and/or energy which we can perceive by any of our senses. For example, in the case of touch these two- and three-dimensional sensorial maps occur all over our bodies because of the nature of our cutaneous sensors being deployed over areas of our skin. A comparison of two spatially and/or temporally separated sensorial maps leads to the discernment of a difference; that difference that makes a difference is information (Bateson, 2000). An additional basic question that needs to be answered is: What is the reason, or what motivates the determination of a difference that makes a difference? This process of discernment of

differences is the process of learning that every homeostatic organism engages in from the time it begins its existence. “Learning is, in part, a process whereby any animal acquires facility in distinguishing among stimuli from its environment … and to which it must selectively respond” (Holloway, 1981).

Further, this comparison of two spatially and/or temporally separated sensorial maps also leads to a discernment of patterns in our environment. A pattern is the result of the comparison of at least two differences, in the same way that a difference is the result of the comparison of two sensorial maps. Also, the recognition of a pattern is really the identification of a sign, which necessarily relates to an object/subject and this is clearly done by an interpreter. The interpreter has the capability to store and remember this pattern as a means to compare and contrast in the act of distributed cognition. A code is formed when an interpreter needs to communicate with another interpreter. A code does not exist before there is this need for sharing or for consensual agreement for which a code is required. Information and pattern forming have a history that is relevant to the survival and sustenance of any homeostatic organism.

In summary, all homeostatic organisms are capable of discernment of sensorial maps, whose comparison leads to identification of spatial and/or temporal differences leading to their development as pattern recognition semiotic homeostatic organisms. Expertise in pattern recognition leads to a process of recognition of patterns of patterns, or meta patterns, which leads to meta meta patterns, etc.

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Necessary fictions: a biosemiotic reading of narrative
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This paper will explore how narrative implements a representational programme that blends specifically human modes of signification with types of semiosis that are common to all forms of animate life. My fundamental framework for doing this will be the concept of code duality, first posited by Hoffmeyer and Emmeche (1991) and since integrated into the conceptual lexicon of biosemiotics (Barbieri et al 2008). However, I will supplement this with two other conceptual resources—namely, Sperber and Wilson’s (1986, 2004) relevance theory (RT) and René Thom’s notion of *prégnance* (1990). My argument will be as follows. RT predicts that a complex message will cause its listeners to engage in extended acts of inference that seek to retrieve the contextual significance of the message. However, when the effort involves becomes too much, the message will usually be dismissed as meaningless or time-wasting. Now, imagine this same message but complemented by representations that engage basic biological affordances—affordances that, in Thom’s words, lead to

"the freeing of hormones, emotive excitement, and behavior designed to attract or repulse the inductive form" (1990: 6). Given that these affordances have inherent rather than relative meaning (Nöth, 1995), their import can invest *any* context with the elemental force of a biological imperative—an outcome that implicitly lends the message universal relevance. What thus emerges is that the most cognitively compelling narratives will be those that maximise *both* inferential demands *and* biological cueing, due to the biological cues causing the act of inferential recuperation to continue for far longer than it otherwise might by guaranteeing the narrative's relevance. It is in this sense that I argue that narrative exhibits code duality. On the one hand, the actions of inference prompting and inference building are inherently plastic; they involve the manipulation of symbols in actions of ad-hoc model building. On the other, the biological cues in a narrative text—what Thom calls *prégnances*—are fixed; they reflect evolutionary inheritances that are significant without carrying information. Moreover, just as ecological niche and genotype co-evolve in the natural world (Odling-Smee 2001; Hoffmeyer 2010), so too do the biological and inferential components of narrative mutually constrain and enable one another. Given this dialectic of the cognitive and somatic in narrative, I suggest that it is a discourse form peculiarly suited to the human *Umwelt*, which is equivalently poised between the infinitely open world of symbolism and the relatively closed world of genetic determination.

Peirce's ecology: the growth of symbols and environmental abduction
Matthew Clements, Birkbeck College

Ecosemiotics increasingly garners attention as a means of broadening the horizons of biosemiotics. Publications by Kalevi Kull (1998; 2001), Winfried Nöth (1998; 2001), Alf Hornberg (2001), and Timo Maran (2008; 2012; 2014) have all explored the development of this approach in order to better appreciate the entanglement of human culture and communication with natural semiotic processes. Just as the process of collective interaction which informs the evolution of living organisms is predicated upon the interdependence of biological and ecological systems, so too are biosemiotics and ecosemiotics perhaps best understood in tandem with one another. Unlike some of the other figures associated with the prehistory of biosemiotics, notably Jakob von Uexüll and Gregory Bateson, the pertinence of ecology is not necessarily explicit within Charles Peirce's work on philosophy and logic. Nevertheless, the importance of both relationality and context to the analysis of semiotic structures establishes the foundational role of concepts which are no less vital to ecology at the heart of Peirce's philosophy of signs (Maran 2008).
My paper will pursue two overlapping aims: Firstly, to continue to make the case for an understanding of Peirce as a proto-ecological thinker, contrasting his debt to Darwin and his interest in error, chance, and complexity with von Uexküll's more romantic conception of life's organisation. Secondly, to suggest that a good way of developing the idea of what Peirce calls symbols is to understand these signs, not simply as tokens facilitating communication, but as emerging and operating at the crux of a distinctly ecological process: the differentiation of an environment. To gain support for this argument I will refer to Peirce's concepts of the 'interpretant' and of 'abduction', and consider that in a sense individual organisms are living symbols articulating the environment in which they are transitively embedded.
In conclusion, I will propose that when addressed to human self-consciousness this

perspective offers a meaningful way for some of those political and philosophical questions confronting critical and cultural theory to be enriched by Peircean ecosemiotics.

Children, modelling and causality – where does narrative come from and what does it do?
Paul Cobley, Middlesex University

In recent narrative theory, 'cognitive narratology' in particular has become fixated on the developed adult human's use of literary narratives and, often, invokes narrative to attempt to prove the evolutionary benefits of 'Art' and 'Literature'. In contrast, this paper will consider the status of narrative in modelling – not *as* modelling, or as some kind of 'instinct' but, after Lotman and Sebeok, as part of a repertoire of phylogenetic and ontogenetic semiosic development. It will draw evidence from studies of parent-neonate interaction (e.g. Delafield-Butt and Trevarthen 2013), as well as published observations of antenatal development, to demonstrate the strong narrative bearing in human nonverbal semiosis. It will also suggest that narrative, when viewed in terms of its role in the development of the semiotic subject in culture, presents the kind of opportunities, threats and imperatives for culture outlined in Hutto's 'Narrative Practice Thesis' (2011). It will show that the unwitting or witting refusal to operate with a broader theory of semiosis such as that offered by biosemiotics threatens to condemn much contemporary narrative theory to rehashing vulgar Darwinism.

Are genes signs and if so what are they signs of?
John Collier, University of KwaZulu-Natal

Genes, being grounded in a code, are often taken to be exemplary of signs in endobiosemiotics. Recent discussion on the Biosemiotics mailing list, however, has shown that this idea is not as straightforward as it might appear before closer examination. I will first discuss if and how genes can (might) be considered to be signs given their material nature and their function in biological systems. Assuming genes are signs, I will discuss what they might be signs of (what their object is). In order to do this I will need to present some background material about the role of genes, how they differ from sequences of DNA, how they are expressed, and how they are transmitted. I will first, for the sake of argument, present a simplified caricature of how genes are expressed and transmitted. Both of these processes are more complex than is commonly supposed, with the very nature of the gene itself not being unambiguous (see Keller 2000), so I will discuss the nature of these complications and any problems this might present for understanding genes as signs. I will put this in the context of how genetic information is transmitted through replication and expressed in traits, for which I have a formal theory involving information channels (Collier 2008) according to which expressed phenotypic and hereditary traits express information in the genes. Two major ideas found in the biological literature of what genes represent are traits and environmental characteristics. I will consider the merits of each of these and some problems that arise for them. Unfortunately I will not be able to come to a decisive conclusion about how genes function as, or more strongly are, signs, but I think the issues I raise will lay a ground for future work on this central problem. My feeling is that many other

issues in endobiosemiotics have similar problems to be resolved, and that if we can solve these in the paradigmatic case of genes, or at least understand them, then we have also made progress in understanding many other sign systems in biosemiotics.

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***Agere sequitur esse*: from 'nothing but' to 'something more'**
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This presentation discusses the logical status of Sebeok's maxim that "sign science and life science are coextensive" by exploring the notion of 'Thirdness in nature', understanding by "Thirdness" the occurrence of the irreducibly triadic relations which constitute semiosis, or the action that is consequent upon the being of signs as irreducibly triadic relations, according to the classical Latin formula "agere sequitur esse" – "action follows upon being", or "as a being is so does it act". The evolutionary universe as we know it begins both without life and without the conditions necessary to sustain life, and develops from there ("nothing but lifelessness") to something more, to wit, the emergence of conditions which make life first possible and then actual. This evolution or "development" from "nothing but" to "something more" requires semiosis, the action of signs whereby what does not exist (the future) exercises through the present an influence which changes the relevance of past events and circumstances in such a way that "something more" results from "nothing but": i.e., the Secondness of dyadic interactions sometimes (through chance events) results in indirect consequences move the lifeless universe ("nothing but") in the direction of being able to support life ("something more"). As the only form of causality which involves nonbeing no less than being, though dependent upon causality at the level of actual being ("existents"), thus, we learn that semiosis not only extends beyond but necessarily antecedes biosemiosis in order for the latter (biosemiosis) to become in the first place possible and then also to continue as actual. Thus, while life-science is indeed coextensive with sign-science (no life without semiosis), it does not follow that sign-science extends *no further* than life science; for if there were no semiosis at work in the universe prior to life, life would not have become possible in the first place. The actuality of life, thus, both *presupposes* and *here and now depends* upon a semiosis at work in the inorganic physical order as first providing and then also maintaining the environment upon which living things through biosemiosis depend,

Cell-matrix adhesion complexes and their dynamic assembly: the poetics of cell attachment
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Cell-matrix adhesion complexes (CMACs) are regions responsible for cellular

attachment to the extracellular matrix (ECM), they are mainly composed by integrins, α/β heterodimers that bind selectively different ECM components through their extracellular domains acting as receptors for this class of molecules. Upon ECM binding the cytoplasmic tails of integrins will interact with a wide range of recruited factors that regulate integrin clustering in the cell membrane; and also activate signaling pathways that will provide a physical linkage between activated integrins and the microfilament system to be remodeled during cell migration. Ultimately CMACs work as functional protein networks that dynamically connect the ECM to filamentous Actin, controlling cell migration precisely through the continual rearrangement of both ECM adhesion, and Actin polymerization. In the present work we shall examine some attempts to conceptualize "cell migration" as an emergent process developed in the recent specialized literature; they introduce the notions of hierarchic organization into levels *i.e.* molecular, sub-cellular and cellular and describe an informational flow of increasing complexity *versus* decreasing number of entities, between these levels. We shall discuss few examples of CMACs remodeling in particular physiological and pathological conditions to argue that cell migration is a process that is also organized into semiotic dimensions. Our approach will not come as an alternative to the systems biology conceptualization initially presented but as a complementary view. Beyond the syntactic level – here illustrated as specific recognition of discrete ECM protein sequences by distinct integrin heterodimers – we shall reach the semantic and pragmatic levels by bringing into light the dynamics of some "word games", e.g. Lewis Carroll's doublets; and magic squares. In such poetic games the synthetic transformations subjected by the words have to deal with semantic rules, but are ultimately dictated by meaning, as concrete pragmatic constrains. We will emphasize the integration of synthetics, semantics and pragmatics also for the CMACs continuous remodeling through cell migration.

The neural and extra-neural scaffolding of human cognition

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In one his seminal article on 'semiotic scaffolding' Jesper Hoffmeyer, notes that what characterizes the process of organismic evolution is "the building up of more and more intricate *[ ] scaffolding* devices in an emergent kind of process that allows evolution to…"invent" new higher-level patterns that subsume aggregates of lower level patterns under their umbrellas" (Hoffmeyer 2014: 19)

In the quote above, Hoffmeyer is referring specifically to *genetic* scaffolding – but makes it clear in many other places in his work that genetic scaffolding is but one example of a more general tendency towards semiotic scaffolding in nature, the result of such scaffolding being an increase in the ways and depth with which an organism can come to effectively 'know' its world.

Clearly, electro-chemical relations have become an integral part of the biological scaffolding that allows extra-mental relations to shape subjective experience and vice-versa – yet an understanding of how exactly this process works remains the 'hard problem' of explaining human consciousness (Chalmers, 1995).

In this talk I would like to examine how Hoffmeyer's notion of semiotic scaffolding might be applied to the study of both body- and brain-based neural

activity, bridging the relations of the world to the relations of the mind to result in a scaffolded semiotic system that ultimately, at least in humans, allows us to even semiotize the scaffolding system itself.

Semiosis and control — from biosemiotics to technosemiotics and back
Eliseo Fernández, Linda Hall Library of Science and Technology, USA

In biosemiotics we attempt to make intelligible the origin, organization and evolution of living systems by throwing into relief the fundamental roles that semiotic causation and semiotic scaffolding play within those systems. We attempt to discern the semiotic interactions involved in guiding and controlling their internal and external dynamics (e.g., metabolism, reproduction, interactions with the environment, etc.) and in establishing the communicational links that relate parts of the organism to each other and connect the whole organism to its environment. To achieve this end we have to successfully integrate explanations based on semiotic causation into well-established accounts given by traditional biology, the latter typically grounded on chains of efficient causation (e.g., bioenergetic flows, oxidation-reduction mechanisms, etc.). How this integration is to be achieved in different situations is somewhat elusive at present. This contribution aims at clarifying some of this elusiveness and offers some possible ways to dispel it.

To that end I review and extend previous results on the various functions of semiosis in both communication and control, and briefly sketch the evolutionary trajectories of those functions from protocells to humans. I aim to show the progressive generalization of the roles of semiotic interactions in and between organisms and between living systems and their environment. This generalizing drive is seen to unfold in an ascending sequence of evolutionary transitions. As in other forms of generalization, there subsist behind the changes certain features that remain invariant throughout that progression. These features are partially retained and expanded at each new evolutionary stage. An outline is presented of the manner in which these common characteristics become manifest at the emergence of new traits, structures and functions, through the agencies of exaptation, replication, divergence, convergence and compositional (combinatory) novelty. These developments are illustrated with examples from different stages of biological evolution. Parallels and analogies are then examined between those biological examples and similar features of the rise of semiotic novelties in the evolution of human material culture, focusing on the evolution of technosemiotic artifacts (e.g., books, microphones, sound recorders, radio receivers, etc.).

The insights developed here are based on an interpretation of evolution as a form of concrete generalization, first proposed by Charles Peirce. This presentation concentrates on empirically driven research and does not dwell on Peirce's ideas beyond some terse and summary allusions. I separately discuss those Peircean evolutionary conceptions in a paper that complements the present one, to be presented at the Peirce Centennial Congress as part of the *Peirce and Biosemiotics* panel. The contribution herein proposed is self-contained and fully comprehensible without recourse to the Centennial paper.

Modelling the semiosis of cognition: the case of the universe of brands
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The dialectic relationship that characterises the semiosis inherent to all forms of cognition emerges from the structural coupling of the living entity and its environment guaranteeing the cohesion and sustainability of a microcosm. Cognition is consequently an embodied, embedded and always situated experience. This means it involves a cognitive entity endowed with a particular physical architecture interacting with the specific physical world it is immersed in, producing a dynamics that defines a narrative that according to the observer is anchored in space/time. Ferreira and Caldas (2012) proposed the mathematical modelling of the semiosis of cognition. The fundamental concepts of semiosis and Uexkuhll's concepts of Umwelt and Innenwelt are at the core of this mathematical modelling. Placing the fundamental "interpretative" process at the core of the model it highlights the essential role played by the meaning assigning process in the phenomenon of cognition and consequently in the production of intelligent behaviour.
The present paper assumes that this model is capable of translating not only the basic semiotic processes present in the natural world, but also the far more complex forms of semiotic structuring that characterize human cognition, namely those that involve the universes of brands and marketing experiences. The particular semiotic features present in a specific marketing campaign are here analysed according to that model.

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Form follows meaning: the role of perception in the evolution of semantic organs
Karel Kleisner, Charles University

The exposed surfaces of animals, i.e., the semantic organs (Kleisner 2008a,b; Maran & Kleisner 2010, Portmann & Carter 1990), form a potent communicative interface which serves as an organ of self-representation of organic selfhood. The innermost dimensions and potentialities of an organism may thus enter the senses of another living being when effectively expressed on the outermost surfaces of the former and meaningfully interpreted by the later. A semantic organ may be a human face, the wing ornaments of butterflies, coat patterns of mammals, etc.

Semantic organs (SO) have three basic sources of variability: (1) intrinsic, i.e., genetic, epigenetic, and developmental processes, (2) extrinsic, that is, the biotic and abiotic environmental conditions which affect the variability of intrinsic generators during ontogeny, and (3) perceptual (semiotic), which stem from differences in *Umwelt*-specific interpretation of a structural basis of semantic organs. The first and the second source of variability jointly form the structural components of semantic organs. Extrinsic and intrinsic sources of variability are, strictly speaking, just precursors to semantic organs, and their study is effectively covered by standard biological research.

Since in the strict sense, the important source of variability in semantic organs is perception, semantic organs are relational entities. They are border phenomena which always come into being via an act of interpretation, and their actual form depends both on the physical potentialities of the bearer and the species specific interpretation of the receiver. The key importance of 'perceptual variability' implies that semantic organs cannot be simply subjected to standard biological research without further ado. Unfortunately, the research agenda of current biosemiotics to some degree suffers from lack of powerful methodologies such as modern biology has at its disposal. We, biosemioticians, usually generate just a more complex re-description of phenomena already known in biology and only rarely are we able to come up with theoretically robust and statistically reliable predictions. I feel especially critical of the – not uncommon – practice of taking a phenomenon, often one that is well understood in biology, and merely re-describing it using a semiotic framework without coming up with any further implications that would contribute to a heuristically innovative understanding of the phenomenon in question. In short, a re-conceptualization or methodological improvement should provide greater explanatory power not only to biosemioticians but also to biologists.

In my contribution, using examples from our cross-cultural research on perception of human faces and from research on biogeography of animal ornaments, I show a possible way of measuring and comparing these SOs between different populations of a species. Specifically, I argue that the perceptual variability should be seen as integral part of an SO, and not just as a faculty of the sensory and cognitive apparatus of the perceiver. This step allows us to treat semantic organs like any other biological object, which in turn opens the possibility of using the rich methodological framework of biology (e.g., visualization of perceptual and structural variability and quantification of the contribution of both components to formation of an SO). Once we view the perceptual component as one of the sources of variability of an SO, this approach becomes compatible with mainstream biology and its methodological tools while, at the same time, fully appreciating the importance of subjective agency on the formation of SO. This approach may help to overcome a gap between what can be objectively measured and what can be colloquially perceived.

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Agency: a biosemiotic approach
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"Biosemiotics is based on an understanding of agency as a real property of

organismic life, a property that is ultimately rooted in the capacity of cells and organisms [...] to interpret signs" (Hoffmeyer 2013: 152). Our aim here is to describe the origins of agency in some further detail. "*Agency* enters with *doing*", as Kauffman (2013: 5) says. A tantamount formulation could be that agency enters with problem-solving (Kockelman 2007; Kull 2012). We propose to analyse the model according to which the principal process that defines agency is problem-solving, i.e. the solution-finding in situations of incompatibility. Accordingly the removal of inconsistencies can be seen as the general invariant of meaning-making processes.
Thus the crux is to define the *situation of problems* as applied to simple living systems. From a physical point of view, this is an unusual situation, because *problem* means the situation of logical inconsistency which is generally not allowed in the modelling of physical systems. However, the incompatibility situation can be imagined as occurring in a system that has acquired two or more habits which apply for the same situation, however in an opposite way. This can be seen as equivalent to the existence of two or more (partially) incompatible codes or sign systems. The way out of such situations is generally undetermined, but if the decision taken by the system is stable, it can be called *learning*. This is the finding of a way to behave without a predetermined algorithm. This requires code plurality, or in Juri Lotman's terms, at least two mediated relations which can create incompatibility; or, in Terrence Deacon's terms, this is where the absence becomes real; and this is precisely where semiosis takes place.

Thus, what the system does in the situation of incompatibility (e.g., of functional cycles) — it has to solve the situation, forming a new habit. This can also be described as negotiation in a distributed system. Therefore the primary object of learning is not anything "in the environment", but the situation of incompatibility itself. There exist different mechanisms of learning, i.e. of solving the new situation. The principal types of dealing with the situation of incompatibility would mean the different types of semiosis (thus different types of signs), which are evidently related to the different types of learning.

Learning (and interpretation) is what makes the connections between the something incompatible; with this, it states meaning. The meaning-making is itself modelling, with the tendency towards usefulness and adequacy, because it solves the logical conflicts, and it does it without any necessary additional feedback except the coexistence of functional cycles with the different codes.

Accordingly, the concept of agency can bring together several features: indeterminacy, multiple codes, learning, meaning-making, habituation, the primary epistemic cut, dialogicity, distributedness.

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Translating life: exploring biosemiotics from a translation-studies perspective
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Biologists, semioticians and biosemioticians, in particular, make frequent use of the term 'translation' though they are by no means the only ones to do so. The same is true for sociologists like Bruno Latour and development-studies scholars like David Lewis and David Mosse. In my understanding, biologists use translation in an effort to link meaning to material and/or biological reality whereas sociologists and development scholars use translation in an effort to link life or the social dimension of reality to the material. Underlying both, I detect common ground in the attack on a Cartesian schism between matter and mind.

Apart from these two, broadly conceptualised, uses of the concept 'translation' which I have chosen for the sake of my argument, one finds a growing field of study called 'translation studies', which, at least in its name, claims to study the notion of translation – independent of any particular, subject-specific interest in translation. In reality though, translation as used in biology and sociology has very little in common with the use of the term in translation studies because the field of 'translation studies' limits itself to what has been defined by Roman Jakobson as 'interlingual' translation, or some forms of intersemiotic translation at best.

This paper envisages a conceptual synthesis between notions of translation as used in the various fields of study discussed above by exploring the problem from the perspective of 'emergent semiotics' as a possible missing link between matter and mind. By making use of a philosophy of complexity, the paper aims at exploring the inter-systemic nature of semiosic phenomena/processes as a paradoxical link that unites matter and mind, reality and virtuality. This link has been hinted at by biosemioticians and scholars from other natural sciences like Jespersen, Deacon, Barbieri, Kull and others, whilst Latour suggested it in sociology. Arguing that the field of translation studies, as a transdiscipline, should have as its focus 'translation' in its broadest meaning, the paper entails an exposition of the notion of semiosis as translation in and of itself, linking material and virtual systems and thus making life possible. The paper will close by indicating the implications of its findings for development in general.

Cultural exposure to a new mammalian species, golden jackal (Canis aureus) – a semiotic analysis
Timo Maran, University of Tartu

The aim of this presentation is to find ways for applying semiotics in species conservation and wildlife management. More specifically, I discuss the problematic emergence of new mammalian species, golden jackal (*Canis aureus*) both in Estonian fauna and in cultural discourse. In the presentation, I introduce the semiotic

methodology (Bouissac 2004, Lotman 2005, Sebeok 1991) that combines biosemiotics and cultural semiotics, and discuss the results of the specific case-study. The first specimen of golden jackal in Estonia was hunted down at the end of February 2013 in Hanila parish, Western Estonia. Messages about encounters with the new species followed from other regions. The new species, its trajectory of arrival and possible influence on the local environment became a topic of vivid discussion among specialists in zoology, environmental officials and local people of Hanila parish. In the end of September 2013, Estonian Environmental Agency classified golden jackal in Estonia as an alien species that is subject to hunting.

In this context nine semi-structured interviews were conducted with local inhabitants in Hanila, professional zoologists, officials of the Ministry of Environment and state environmental agencies. The interviews were arranged around the following topics: participants in and the nature of discourse on the golden jackal, the position of the golden jackal in regard to Estonian nature, the concept of invasive species, and cultural and ethical issues related to the golden jackal.

Results of the study included, first, outlining the position of the golden jackal as a semiotic subject both in the local ecological system and cultural discourse (Low 2008). Emphasizing the animal agency provides clearer understanding of the dispositions in culture in regard to the new species. Second, the study helped elucidate the different bases and analogies that were used for modeling the new species. Third, the study provided some understanding of the temporal dynamics (Callon 1986) of the cultural exposure to a new species.

The presentation also discusses the prospective methodological devices and further applicability of semiotics in species conservation and wildlife management.

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Notes towards a bio-poetics

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In the field of narrative theory there are two main approaches – those derived from structuralism and those derived from hermeneutics. Hermeneutics focuses more on understanding and structuralism on explanation. As an example, in relation to the central character, hermeneuticists may discuss the goals, purposes and values of the

agent. Whereas structuralists may focus on the lack, function and transformation of actants. Each of these theories adds a great deal to our understanding and we cannot do without either. This is why the work of James Jakob Liszka is so important because it enables us to combine the insights of both. Liszka has shown us how narratives are stratified into layers - the actantial, the agential and the narrative system. The agential deals with the character in their social and economic context amidst their norms and values. The agential places the character as a function within the plot.

Liszka's theory is based on the semiotic of C.S Peirce and like Peirce – and Habermas - he argues for a dialogic interpretation free of constraint. I would fully endorse this, but I would add that the more that we know about narrative the better the dialogic communication will be. This is why I will suggest that his layers of the narrative can be deepened even further to include at least the cognitive and the biological. To achieve this I will be making use of Roy Bhaskar's social cube. To explain why this is necessary, structuralism can describe how narratives always resolve a contradiction and hermeneutics can explain how the narrative always describes a conflict between values. But neither can explain the relationship between conflict and narrative. Or structuralism can show that narratives always describe a transformation and hermeneutics can explain the meaning of a specific change, but neither can explain the relationship between change and narrative.

To explain these and many other gaps in our knowledge we need to explore the deeper levels. This is why I will be suggesting in this essay that it is vital to develop bio-semiotics into bio-poetics to help understand the emergence of the capacity for narrative and what light this can shed on some of these issues.

Biosemiotics is a hybrid.

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In claiming "We have never been modern" Latour distinguishes between"purifiers" and "hybridisers". Purifiers, broadly, are natural scientists who aim to reveal the natural world in its pristine state, shorn of human cultural constructions. Although this project is self-contradictory, science being a cultural construction, their Platonic programme to disclose essential truths about the world that lie hidden behind the particularities of human experience, has been immensely productive. Hybridisers, perhaps even more broadly, are those who, with Thomas Nagel, believe that "Truths are made, not found". They are more likely to allow, with C.S. Peirce, that what we take to be laws or constant features of reality are best seen as relations in process.

Of course, there are not two distinct groups here but rather there is a continuum with different disciplines, and different individuals within disciplines, occupying different positions on it. This paper will address the question: what positions do linguistics and biosemiotics occupy?

Language, being a human monopoly, would seem to be the concern of hybridisers. Yet claims are made, by Chomsky (2007) and others, that some syntactical features of language are biological givens. This would mean that language depends on formal essentials which, like the truths of mathematics, exist in some Platonic sense

independently of what human beings do. This move language towards the concerns of purifiers.

Biosemiotics also appears to be the concern of hybridisers, but here too there are occasional claims to Platonic essentialism. For example, Patee (2005) takes the ubiquity of signification to indicate that it is a primordial feature of the natural world, independent of who or what is doing the signification. This moves biosemiotics towards the concerns of purifiers.

As an arena to examine this issues, this paper will use the recent work of Tomasello (2008) and others on the gestural origins of human communication. Now a gesture can, potentially, act as sign in a richer and more open sense than the way in which say, odours or a patterns of coloured marks, can act as signs. It is flexible, it can be repeated, it can be combined with other gestures and it can be modulated in a wide variety of ways. Tomasello's speculations on how gestures may have acquired the properties of language are rich and suggestive. However, they leave open some important issues. Two of the most important of these are how the denotatives (e.g. "this" and "that") might have evolved from pointing and how verb-like and noun-like functions might have evolved from the use of mimetic or iconic gestures.

It will be proposed that closure on both these issues can be achieved by use of the conceptual vocabulary of biosemiotics. The crucial step, not found in Tomasello, is the recognition of a gesture as, in Peircian terms "Something that stands for something else." This is one reason why apes, despite the prolonged efforts of human beings, do not acquire language, even though they learn to use gestures extensively.

This proposal does not, however, return the locus of language competence to something inside the organism. In fact it does the reverse, by suggesting that this capacity to recognise a gesture as signifying something other than itself was the first step in the externalisation of products of the proto-human and subsequently the modern human mind. Once started, this process led to the accumulation of human habits of thought and action which now constitute culture and which hence produce the modern mind.

This process, of emptying the organism and filling the environment, firmly establishes biosemiotics, and linguistics along with it, as the concern of the hybridisers.

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Peirce's ten classes of signs: modeling biosemiotic processes and systems
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The morphological variety of semiotic processes is usually reduced to three (non-excludent and hierarchically organized) classes of signs based on sign-object relation (icon, index, symbol). That is acceptable if we observe very exemplary ('border line') phenomena, which is obviously rare. In order to more accurately describe minimally complex semiotic phenomena, C.S. Peirce developed several classifications of signs (10 and 66 classes) based on several trichotomies (see EP 2:289-99 and 478-91). The consequence is an enormous accuracy of the relations observed within semiosis (S-O-I). The importance of this classification must be emphasized. Semiosis exhibits a rich variety of morphological patterns. The morphological space of semiotic processes into which biosemiotic systems are embedded include proto-symbols and variations of indexical signs, beside symbolic and iconic processes. And there is no way to describe these processes with some accuracy examining only the sign-object relationship. Peircean mature typologies provide a detailed description of several inter-related aspects involved in semiosis including the intrinsic nature of signs and the effect on the semiotic agents.

However, few semioticians have approached Peirce's extended typologies of signs, developed from 1903, which still seems obscure, structurally intrincate and hard to apply to empirical phenomena. To make things worse, it remains the tendency to think that the extended typologies are extravagant and unproductive conceptual-tools. My argument suggests something different. Such classifications should be considered as an important advancement with respect to the task of empirically modeling the morphological variety of signs, and constitute one of the most important topics of Peirce's mature semiotic. My main assumption here is simple: the morphological space of semiotic events and processes into which biosemiotic systems are embedded always include intermediary and mixed classes of signs (e.g., proto-symbols). If correct, any Peircean based tentative of classifying biosemiotic processes should consider the extended typologies of signs, according to which several aspects of sign-object-interpretant (S-O-I) relation are described.

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Biosemiotics, meta-communication and the Human Rights paradigm

Alessandro Samsa

Biosemiotics, particularly in its subsuming of anthroposemiotics, is probably the disciplinary field that gives a glimpse of a future realistically viable path towards the definitive overcoming of the nature/culture bias in the direction of a fully integrated approach to human behavior. The real revolution of perspective is the one which leads us to consider the human rights paradigm no longer, or not only, a matter of ethics, but a fact of communication and signs, as a form of self-communication, since such a radical shift of perspective allows us to relate the historical statement of human rights with the dynamics of human evolution.

This paper will focus on these dynamics, first analyzing what is considered the key text of the human rights paradigm - the *Universal Declaration of Human Rights*. It will show how it is possible, starting from the formulations in the field of semiotic textology developed by Janos S. Petofi (the TeSWeST) and others, to identify in the human rights paradigm a form of social meta-communication that refers to possible worlds of a utopian type, in the usage of formal logic and through the use, indirect and sometimes even direct, of the lie. This, as well as the historical purpose/function of paradigm (which refers in turn to the question of intentionality), will be cast within an ethological and zoosemiotic perspective - the desire to conserve the species by the elimination of social conflicts and the maximization of relationships between individuals.

Evolutionary constraints or opportunities?
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Natural selection is traditionally viewed as a leading factor of evolution, whereas variation is assumed to be random and non-directional. Any order in variation is attributed to epigenetic or developmental constraints that can hinder the action of natural selection. In contrast I consider the *positive role* of epigenetic mechanisms in evolution because they provide organisms with opportunities for rapid adaptive change. Because the term "constraint" has negative connotations, I use the term "regulated variation" to emphasize the adaptive nature of phenotypic variation, which helps populations and species to survive and evolve in changing environments. Metaphorically speaking, regulated variation is comparable to handrails on a narrow hanging bridge that provide an opportunity for a person to cross the river, rather than being a constraint. The idea that only fixed traits are heritable should be dismissed because all phenotypic traits are dynamic and become acquired during development and growth. The main criterion of heritability is that closely related organisms in similar environments have more similar traits than non-related organisms, and this criterion can be applied even to epigenetically-controlled traits and to learned habits. It is conceivable that embryo development includes elements of learning via trials and errors in cell populations. Because phenotypes are multidimensional, heritability is not a number but a G-matrix. This kind of statistical definition of heritability separates those dynamic traits that are heritable from those that are not heritable. This approach to heredity does not agree with the common notion that the development of an embryo follows a "blueprint" inscribed in the genome. In particular, the capacity to produce regulated variation is a phenotypic property, which is regulated by the genome but not described. In biosemiotics, information is characterized as a "difference that makes a difference" for a certain living agent (Bateson, 1972) (p. 459). Because the vast majority of differences is ignored and only a small portion is picked as a sign, any description is fundamentally incomplete (Hoffmeyer and Emmeche, 1991). The genome acts as a switchboard, where mostly random mutations switch "on" or "off" preexisting functional capacities of organism components. Thus, there are two channels of heredity: informational (genomic) and structure-functional (phenotypic). Functional capacities of living systems most likely emerged in a chain of modifications and combinations of more simple ancestral functions. The role of DNA has been to keep records of these changes (without describing the result) so that they can be reproduced in the following generations. The existence of hidden capacities of adaptive variation is supported by such facts as macro-mutations,

phenocopies, preadaptations, parallelism, and combinatorial variation. Evolutionary opportunities include adjustments of individual functions, multitasking, connection between various components of an organism, and interactions between organisms. Lineages with most advantageous patterns of regulated variation produce more species and secure more resources, which is a long-term lineage selection (Thoday 1958).

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What practical bearings does biosemiotics have in daily clinical settings? Some considerations on the home visit cases of patients with dementia.

Mizuo Sumida, Kin-ikyo Tomakomai Hospital, Japan

In this paper, based on the participant observations conducted as an internal medicine practitioner in Japan, I will argue some consequences that biosemiotic perspectives would have in medical practices. In today's primary care settings, physicians with no specialty of psychiatrics must often cope with people diagnosed as dementia (now re-classified as major neurocognitive disorder in DSM-5). Mainstream medical sciences seem to aim eventually at more biologically specific treatments for any mental disorders, and this inclination shows a tone of underrating more symptomatic ones though such treatments as cognitive rehabilitation and formal exercise both of which are in essence very congenial with biosemiotics are seemingly recommended as effective. Contrary to biosemiotics, the diseases or disorders are mainly considered to be detached from the whole persons as the ever-meaning-making subjects interacting with their milieu. It is quite difficult to develop the relationship between the patient's symptoms and three Uexkuellian layers of their feeling to be clinically applicable tools for bioscientifically oriented medicine. Moreover today's pharmaceutical empires governing biomedical worlds make one not sure that in actual clinical practices biosemiotics can afford Peircian clear concept 'which might conceivably have practical bearings, we conceive the object of our conception to have.' However, we can persist in re-creating, in-forming or even unlearning significances of many biomedical concepts which had been discovered and invented by scholars with mechanistically oriented mind-setting into more suitable for the truly lived world, and this kind of worldview can be coordinated with the medical practice as heeling commitment through exploring Umwelt of each patient via the communication such as narrative one. In this regard, I will offer some home visit cases in one of which a patient with mild dementia has created a meaning-rich semiosphere by making *senryus* (Japanese humorous seventeen syllable poems) and as a conversant, I had taken a part of translator. These cases, or more accurately speaking, these experiences, suggest that physicians also could delve into patients' not only Secondness but also Thirdness or even Firstness through trying hard to share or co-

create experiences with them. Especially as to patients with severer dementia, symbolic and iconic felt layers might possibly be more approachable than indexical one. Although this mode of practice is not at all new, I argue that sticking to biosemiotic standpoints can be the safeguard against degenerating medicine as a caretaking activity into an easy prey of pharmaceutical companies. In addition, I analyze the typical causation and the effect/side-effect logic used by mainstream biochemical/pharmacological sciences as obstacles of taking biosemiotic approaches, and critically ponder the ethical meanings of the pill taking habit of our biomedicalized world.

Language as catalytic process

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Davia (2006) has proposed a new theory that grounds biology and neuroscience in a general theory of the process of catalysis. I shall explore the implications of this general theory for our understanding of human language. Davia's hypothesis is that at every scale, "living processes are processes of catalysis, and that all biological processes mediate transitions in their environments, employing the same mechanisms as enzymes." (2006: 255). Enzymes are the prototypical catalysts: autocatalytic reactions occur when an enzyme catalyzes a chemical reaction without itself being changed (Davia 2006: 261). Following the theory of autopoesis developed by biologists Maturana and Varela (1980, 1987), Davia has questioned the view that cognition represents information about an independent world 'out there' that is external to the organism. The theory of autopoesis proposes instead that organisms create their worlds through their interactions with it. The catalytical view suggests that life processes at all levels are unified by self-similar fractal patterns on multiple scales of the entire body-brain system (Ho, 1993; Markoš, 2002): languaging is whole-body sense-making in this sense. On this view, linguistic catalysis triggers large-scale complex oscillatory patterns in the nervous system that constitute large-scale unified states that potentially ramify across all scalar levels of the organism's organization and affect it.

Rejecting both the idea that words and wordings are representations of encoded content (Bickhard, 1998) and the phenomenology of abstract linguistic form on which most current accounts of language are based (Thibault, 2011a, 2011b, 2011c; In Press), I will consider how a theory of language as catalysis that was first outlined by Iberall (1983) and Verbrugge (1977, 1985) might be developed. Such a theory grounds linguistic interactivity and hence cognitive dynamics in a broader theory of embodied-embedded action-perception: language is a form of extended action-perception (Hodges, 2007). Speaker-hearers attune to language specific kinetic/tactile-enkinaesthetic (Stuart, 2010) invariants (felt movement patterns) in co-articulated phonetic gestures. These invariants can be modulated in ways that constitute the actual synergy of phonetic gesturing in coordination with world-side factors in particular occasions of human interactivity (Cowley, 2008; Steffensen, 2011). Speaker-hearers' attunement to non-arbitrary linguistic invariants (structure) in, say, co-articulated phonetic events (Fowler, 2010) has the capacity to catalyse and therefore to enable and to constrain flows of action, awareness, feeling, and perception that are embedded in social practices of many kinds. On this view, linguistic functions (e.g. Halliday, 1979, 2004) are not encoded in language forms,

but are dependent on and are grounded in the culturally enabled and constrained bio-social relations between speaker-hearers and the affordances of linguistic events.

Descartes' dualisms and the epistemology of biosemiotics
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René Descartes (1596–1650) has been reckoned as a primary antagonist of biosemiotics ever since Friedrich Salomon Rothschild introduced his seminal 1962 paper with the following statement (p. 774): "The concept of the symbol shows the way to overcome René Descartes' partition of man into the self as *res cogitans* and the body as *res extensa*. In the symbol psychological meaning and physical sign appear as a unit". What is referred to here, and has repeatedly been referred to in later biosemiotic literature, is Descartes' infamous substance dualism, which is often associated with the mind–body problem, a problem Descartes can be said to have introduced in the modern age. While substance dualism is an instance of ontological dualism, Descartes' position, which was so important to the establishment and growth of modern science, also implied epistemological dualism, i.e. the view that the (in Cartesian sense human) subject and the objects perceived by it are radically different. In simplified terms, this perspective can be characterized as implying that the knowing subject stands "outside", or is independent of, the world which it comes to know about.

In contrast, phenomenology (in its non-Cartesian versions) and hermeneutics have maintained that the knowing subject is always a part of the world that it navigates in and attempts to understand. This perspective is also central to Jakob von Uexküll's Umwelt theory, and to *Uexküllian phenomenology* (Tønnessen 2011), a version of phenomenology derived from Uexküll's work and characterized by the assumption of the universal existence (in the realm of life) of a genuine first person perspective, i.e., of experienced worlds. A living being and its phenomenal world is a unity, and the two can only be understood in tandem.

"Knowing", as Kalevi Kull (2009: 81) has argued, "is a distinctive feature of living systems." Animals know – plants know – even microorganisms know (not to mention distributed knowing in various composite systems). It is the task of biology to study and describe *what* they know, and *how* they know what they know. This implies the ontological finding that all living beings are knowing creatures, and the related epistemological observation that in order to get to know as much as possible about the world at large (the natural world included), we must base much of our human knowledge on getting acquainted with what non-humans know. In consequence, biology, and perhaps zoology in particular, is key to contributing to overall human knowledge. This perspective is very unlike that of Descartes, which was that animals are machine-like and bereft of any true intelligence or rationality.

In conclusion I will refer to the common critique of Cartesian dualism found in health science in general and nursing science in particular. In doing this I will discuss to what extent biosemiotics does or should share a (w)holistic view of humanity, and of nature. In one version, such a view of humanity implies that human life has four dimensions, namely a physical, a psychological, a social and a spiritual dimension (and a reductionist view typically amounts to acknowledging only the physical

dimension).

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The interplay of cognitive and action-guiding signs in intelligent animals
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Many biosemioticians use C.S. Peirce's semiotic terminology and typologies of signs quite freely in order to describe any seemingly semiotic process of life. Peirce nevertheless defined his concept of sign and semiotic as a logical concept and theory. As such its principal purpose was to develop a logic of science, how rational scientific inquiry proceeds and what are its normative standards. Although this does not mean that the logic of science would be the sole domain of application of Peircean semiotic terminology, the constructive origin of the concept and its classifications may have left its traces into their compositional structure and context. Peircean semiotics is the most clearly applicable to such cognitive processes that either construct or modify some kind of internal model of the (part of) the life-world of a semiotic agent. Such a semiotic agent must be at least in principle capable of self-reflection and intentional self-modification of these processes, even if these abilities were not (or even never) actually used. While some animals are more or less human kind in this respect, the most candidates of biosemiotic agent do not seem to have any updatable internal model of the world at all but yet be capable of self-functional world-construction.

I will argue that instead of trying to generalize (and dilute) the Peircean logical concept of sign, it might be more reasonable to search for other, perhaps less rich, concepts of sign and meaning besides of the logical one. Peirce's classification of sciences gives one hint for the starting point. For Peirce, logic was a theoretical philosophical normative science, "the theory of self-controlled, or deliberate, thought" (EP 2:260, 1903), but besides logic there is also other normative sciences, esthetics and practics/ethics. Especially practics is here in interest – a science of self-controlled conduct, which should in generally be conceptually independent on logic. The positive content of the practics is nevertheless in its normative characters. While logic has only one (truth about the object), practics have many, whether the result of action really correspond the expectation or not. This expectation or the 'idea' that is tried to 'materialize' in the action functions as another kind of sign that mediates transition from one state of the agent to another one. Such concept of non-representational action-guiding sign might be needed in semiotic modelling of perceptual processes, creative interpretation, or any practical purpose-oriented action besides the logical concept of sign.

In Peirce's own few descriptions of the subject matter of practics, the logical signs are nevertheless in use when human action is self-controllably guided – the deliberateness of the processes studied by practics are due to small inquiries (thought-experiments) that are used to anticipate the effects of action or its plan before it is actually executed. Such interplay of cognitive (logical) and "practical" action-guiding signs is plausibly present also in animals capable of forming an updatable internal model of their local world. But among less responsive species or in smaller scale processes the semiosis if it occurs is mediated solely by action-guiding signs. One task of biosemiotics is to draw the line between these somewhat different kinds of semiotic processes, i.e. to identify correctly whether in a studied case there are also cognitive signs in action.

Does linguistics need biosemiotics?
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Kalevi Kull, University of Tartu
Stephen Cowley, University of Southern Denmark

At the 2013 Gatherings in Biosemiotics, we already had an opportunity to present the project *Biosemiotic perspectives in linguistics*. Now that the volume of articles is ready, we can state that one of its most striking distinctive features consists in the fact that many contributions, in one way or another, touch the historical aspect of the subject *par excellence*. In other words, the history of relations between linguistics, biology, semiotics and – last but not least – biosemiotics seemed to be preferable for many participants as the principal subject of their articles, in comparison with (synchronic) research in the linguistico-biosemiotic field as such. This fact, together with the rather reserved attitude of some linguists towards the very idea of collaboration with biosemioticians (once again, commented upon at the 2013 Gatherings), allows us to raise the question whether linguistics really needs biosemiotics today.

Despite some possible scepticism, our own answer to this question is undoubtedly affirmative. First, even the historical orientation of research often provides a new vision of phenomena which seemed to have already been well studied before, and some articles in the volume illustrate well this thesis by taking new approaches to the study of such classics of linguistics as F. de Saussure or N. Chomsky. Secondly, as *it is the point of view which creates the object*, a new vision of one or another phenomenon results at the same time in the change of the main subject of the corresponding research. We shall expose this tendency with the example of the transfer of researchers' interest from static to dynamic models of description and from *language* understood in a systemic way to *language* as a constantly evolving phenomenon.

Finally, our presentation will introduce the result of our project: the book of collected articles in which researchers from several countries working in various disciplinary fields took part.

The deep-shaping power of the human modeling process
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Thomas A. Sebeok's reformation of the critical Lotmanian concept of modeling has made a significant contribution to our common cause of semiotic inquiries. However, contemporary studies on Sebeok's thoughts on modeling, in particular Modeling Systems Theory co-presented by Sebeok and Marcel Danesi in 2000, are largely confined to introductions and applications. Seldom has the possibility arisen that they can also be tested, expanded and refined through interactions and collaborations with other research findings in order to remain a living system and become a more functional one. This conviction has directly inspired the present writer to incorporate into semiotics the latest confirmed discoveries in neurocognitive sciences, particularly cultural neuroscience, and thus formulate that the process of semiosis has an effective deep-shaping power over the individual human modeler. Put another way, aside from the long established Peircean belief that signs philosophically and epistemologically make us what we are, it should be noted that the behavior of modeling actually influences and even alters the organic make-up and biological structure of the human body, in particular the human brain. This synthesis brings to light a hidden fundamental mechanism that underlies the diversified manifestations of sign activities in and across different human societies and cultures. It is also believed to be able to help understand human communication from a dynamic biosemiotic perspective.