

Sign, function and life: Thinking epistemologically about biosemiotics

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Abstract. This article focuses on an epistemological analysis, Bachelardian and Saussurean, of the problematics of biosemiotics. This discipline is first characterized in its general features, and in contrast with biolinguistics – a characterization that allows us to see its foundation on the traditional definition of the sign. Then, the Saussurean break with this traditional definition is explained, and with it the theorization which is constitutive of the Saussurean concept of language (*la langue*), explaining the given: the idioms. Biosemiotics appears in this “recurrent light” as a scientific ideology in the sense of Georges Canguilhem. It is a counterpart of structuralism, another scientific ideology, which emphasized the notion of structure, whereas this time it is the sound/sense relationship that is at the heart of the elaboration. Its commonality of problematics with and its singularity in relation to biolinguistics appear at the same time: if biolinguistics and biosemiotics both ignore the heterogeneity and the discontinuity constitutive of language, the reductionism of biosemiotics takes the form of a dissolution instead of the organicism underlying biolinguistics.

Keywords: semiosis; value; functioning; ontogeny; phylogeny; organicism; scientism; scientific ideology

Biosemiotics is a relatively recent discipline, emerging in the 1970s. In “Biosemiotics in the twentieth century: A view from biology” Kalevi Kull (1999: 386) defines it as “the science of signs in living systems”. For his part, in “Introduction: An evolutionary history of biosemiotics” which constitutes the first chapter of his *Essential Readings in Biosemiotics: Anthology and Commentary*, Donald Favareau (2010: 3) insists on the synthesis constituted by the emergence of this paradigm, between the science of signs and modern science, heir to the Cartesian separation between soul and body and tempted by reductionism:

[...] the goal of biosemiotics is to *extend* and to *broaden* modern science, while adhering strictly to its foundational epistemological and methodological

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commitments. It does not seek in any genuine sense of the term to “oppose” much less “supplant” the scientific enterprise, but to *continue* and to *develop* it, re-tooled for the very challenges that the enterprise itself entails, if not demands.

This articulation between semiotic thinking and (life) science is of interest to the epistemologist of linguistics in two main respects. First, it establishes a link, through semiotics, between biology and linguistics, and in so doing takes into account the heterogeneity of language, which places it at the confluence of – among others – life science and the so-called language sciences. Biosemiotics thus deserves consideration for the answer it provides to a major scientific question, made all the more acute by the spectacular growth of biology over the last century and a half. Moreover, the very constitution of biosemiotics implies overcoming the traditional but insistent opposition between the “hard” sciences and the humanities, an opposition about which there is every reason to believe that it constitutes an epistemological obstacle, in the sense of Gaston Bachelard (see Bachelard 2004[1938]).

It is therefore this purpose of biosemiotics that I will submit for analysis in this article – not by any particular author, but in its general character, that is, as a problematic. My analysis falls within a Bachelardian and Saussurean problematic, the first qualifier necessarily implying, in linguistics, the second. Bachelard taught the theoretical primacy of error, that is, the constitution of scientific thought by successive rectifications, which are as many epistemological breaks. He also enjoined the epistemologist to put himself “in the school of scientists”, the only way to access the rationalism of a scientific discipline. It is by following this injunction in my field, linguistics, that I took the measure of the epistemological break operated by the Saussurean theorization of language, an epistemological break that now requires the constitution of a Saussurean science of language (see in particular Toutain 2012; 2014; 2015; 2016), in the broad sense of this last term, that is to say as a heterogeneous object. Such a constitution cannot be achieved otherwise than through theoretical work. It seems to me, however, that in the current state of language sciences – again in the broad sense of the term – epistemological examination of already constituted paradigms, although controversial and not constructive,² can usefully contribute to this work.

I will begin by setting out the main features of biosemiotics, from both the semiotic and biological points of view in Part 1 of the article. A detour through

² “*A quoi reconnaît-on le structuralisme?*”, by Gilles Deleuze, ends with the following statement: “*Aucun livre contre quoi que ce soit n’a jamais d’importance; seuls comptent les livres ‘pour’ quelque chose de nouveau, et qui savent le produire*” (“No book against anything is ever important; the only ones which count are the books ‘for’ something new, and which can produce it”: Deleuze 1973: 16).

the Saussurean theorization of language, outlined in Part 2, will then allow me to highlight the character of scientific ideology, in the sense of Georges Canguilhem (see Canguilhem 1977), of biosemiotics, as well as the specificity and the stakes of this ideology (Part 3). If the concept of structure is at the heart of structuralism, another post-Saussurean scientific ideology (see Toutain 2015a), which is no stranger to the development of another discipline dealing with the heterogeneity of language, that is biolinguistics, it is here, in biosemiotics, the sound/meaning relationship that is central. This opposition does not fail to evoke, *mutatis mutandis*, the paradigmatic opposition in the history of biology between mechanism and vitalism, which indeed is recalled by many biosemioticians. This rapprochement, however rapid and limited it may be, is no less significant. The question of the specificity of living organisms, which is at the heart of vitalism and biosemiotics, is in fact coupled with a second one: that of the specificity of humans as *homo loquens*, *speaking animals*, to which biolinguistics and biosemiotics provide answers that are both different and fundamentally similar in their ignoring of the heterogeneity of language and in the nature of the impasse to which they lead: the first “mechanistic” and “structuralist”, the second “vitalist” and “semiotic”.

1. Biolinguistics and biosemiotics

Language is commonly defined, at least since Saussure, as a system of signs, a definition that makes linguistics a branch of a larger discipline, semiotics, the science of signs and sign systems. By contrast, there is no inclusive relationship between biolinguistics and biosemiotics. As Winfried Nöth shows, in particular in his article “Biolinguistics and biosemiotics” (2015),³ these two “interdisciplines”, although almost contemporary, have indeed developed in parallel and independently of each other.⁴ Moreover, their theoretical presuppositions are distinct.

Biolinguistics, the most illustrious representative of which is Noam Chomsky, defines language as a human faculty that can ultimately be explained by its biological substrate. For example, we can read in “Three factors in language design”:

The biolinguistic perspective views a person’s language as a state of some component of the mind, understanding “mind” in the sense of eighteenth-century

³ See also Augustyn 2009, which nevertheless endeavours to highlight the points of convergence between these two paradigms.

⁴ Nöth (2015: 154) also notes this lack of an inclusion relationship: “Since language is a sign system and semiotics is the study of signs and systems of signs, biolinguistics should be a branch of biosemiotics. In reality, however, there is only an overlap between the two research fields and most publications in biolinguistics are not based on biosemiotic premises”.

scientists who recognized that after Newton's demolition of the only coherent concept of body, we can only regard aspects of the world "termed mental" as the result of "such an organical structure as that of the brain" (Joseph Priestley). (Chomsky 2005: 2)

Language is thus conceived as a product of the brain, analogous, as such, to the visual or auditory systems. Chomsky (2005: 2) continues:

Among the vast array of phenomena that one might loosely consider language-related, the biolinguistic approach focuses attention on a component of human biology that enters into the use and acquisition of language, however one interprets the term "language." Call it the "faculty of language", adapting a traditional term to a new usage. This component is more or less on a par with the systems of mammalian vision, insect navigation, and others.

It "has general properties of other biological systems", and with that in mind, "we should be seeking three factors that enter into its growth in the individual: (i) genetic factors, the topic of UG [universal grammar], (ii) experience, which permits variation within a fairly narrow range, and (iii) principles not specific to language" (Chomsky 2007: 19). This conception determines the object of generative grammar, namely the construction of universal grammar. Chomsky (2007: 19) thus distinguishes two stages in its elaboration: first, generative grammar proceeded "'from top down', so to speak: How much must be attributed to UG to account for language?" (Chomsky 2017: 19), before the minimalist programme, which proceeds for its part "'from bottom up': How little can be attributed to UG while still accounting for the variety of internal languages attained, relying on third factor principles?"

If biolinguistics can thus be considered as a stream of linguistics, biosemiotics has for its part emerged at the confluence of two research trajectories, semiotic and biological, respectively. On the semiotic side, the foundational work is that of Thomas Sebeok, who, as Donald Favareau (2010: 35–47) shows in the introduction cited, has achieved a synthesis between Peircean semiotics and Jakob von Uexküll's theory of *Umwelt*. The schools of Tartu and Copenhagen were for their part formed around biologists who felt the need to replace the semiotic and linguistic metaphors that flourished in biology after the discovery of DNA as a support for genetic information and the development of molecular and cell biology with a controlled import of operational semiotic concepts deemed likely to renew theoretical biology: Jesper Hoffmeyer (for example 1996[1993] and 2008), Claus Emmeche, and Kalevi Kull, in particular, to whom we must notably add the Italian Marcello Barbieri, whose "semantic biology" (Barbieri 2003a) has converged,

despite theoretical differences,⁵ with biosemiotics (see for example Barbieri 2008 and 2010). From this perspective, it is not a question of the biological foundations of language, but of a new semiotic definition of the living being, which will also constitute the framework for any reflection on language as being specific to the human living. As Nöth (2015: 159) points out:

Sebeok's biosemiotics is not directed towards affirming the uniqueness of the human language faculty. In the debate between the essentialists and the evolutionists, in which we find biolinguists generally taking the essentialist side, biosemioticians are usually found on the evolutionist side. The former argue that language is essentially "different from other forms of communication and that language separates humans from other species";⁶ whereas the latter postulate continuity in the growth of sign processes and systems. Furthermore, whereas biolinguistic research begins with the origins of language, the biosemiotic research program begins with the origins of life.

Kalevi Kull, Claus Emmeche and Jesper Hoffmeyer (2011: 13–14) state similarly in "Why biosemiotics? An introduction to our view on the biology of life itself":

The name *biolinguistics* has been used for studies on the biological basis of human language, or the study of relations between physiology and speech. Despite many parallels between biolinguistics and biosemiotics (see Augustyn 2009), these traditions are quite different. Biolinguistics tries to apply the existing (physicalistic) biology in linguistics. Biosemiotics finds it necessary to put biology on a semiotic basis before integration of the theories of biology and linguistics.

Biolinguistics and biosemiotics thus constitute two distinct, albeit parallel and contemporary, developments: distinct by their theoretical foundations, and distinct by the framework in which each of them takes place. The starting point of biolinguistics is indeed language as a specifically human faculty. That of biosemiotics is the notion of the sign as the common denominator of different scientific fields, which can thus be unified. Biolinguistics and biosemiotics are thus based on two different understandings of language: as a *sui generis* faculty and as a special case of a sign system. The examination of biosemiotics thus confronts us from the outset with the question of the specificity of language, and one cannot

⁵ On that point, see Favareau 2010: 58ff, which shows that "[w]ithout a doubt, the most radical challenge to the Peircean approach to understanding the sign relations of living systems comes from embryologist and *Systema Naturae* (and now also *Journal of Biosemiotics*) editor Marcello Barbieri, who posits an alternative biosemiotic paradigm that is not organicist and qualitative in its origins, but mechanist and quantitative through and through".

⁶ Here, Nöth is quoting Messer 1995, A.-G. T.

fail to think here of the Saussurean hesitations concerning the relationship to be established between semiology and linguistics (see Part 3 of this article).

This difficulty is all the more remarkable in that biolinguistics and biosemiotics are nonetheless two treatments of the heterogeneity of language, which is a linguistic object but which can also be claimed by other sciences, first and foremost biology (it is a faculty that is properly human, the necessary condition for which is a particular genetic and neurological equipment) and psychology (there are close links between language and thought, and language learning and psycho-affective development are closely associated). The result in both cases is indeed the elaboration of a common object between linguistics and biology. Chomsky sees language as a biological system, and thus sees linguistics as a branch of biology (see for example Chomsky 2007: 14). Nöth also emphasizes the proximity of biolinguistics to neurolinguistics and stresses its interdisciplinary connections (see Nöth 2015: 156–157). The status of biosemiotics is more complex since, while some biosemioticians refuse to make biosemiotics a branch of biology, or even a natural science (see Nöth 2015: 158–159), biosemiotics, as a theoretical biology, is nevertheless conceived by others as a refoundation of biology. The third chapter of *Towards a Semiotic Biology: Life is the Action of Signs* by Jesper Hoffmeyer is thus entitled “Biology is immature biosemiotics”, and in “Code-duality and the semiotics of nature” by the same author and Claus Emmeche it reads, for example:

What we propose then, is that the traditional paradigm of biology be substituted by a *semiotic paradigm* the core of which is that *biological form is understood primarily as sign* (whether analog or digital). (Hoffmeyer, Emmeche 1991: 138)

As emphasized by Kull (1999: 386) in “Biosemiotics in the twentieth century: A view from biology”, “[t]herefore, biosemiotics can be seen not only as a branch of semiotics, but also as an approach in theoretical biology”. Marcello Barbieri’s statement in “Biology with information and meaning” is also worthy of note:

Organic information, in short, is the raw material for the mechanism of *evolution by natural selection*, while organic meaning is the raw material for the mechanism of *evolution by natural conventions*. This means that the concepts of organic information and organic meaning – or the equivalent concepts of copying and coding – are the true foundation of biology, even if we may need to extend them with other concepts or with other qualifications at some higher levels of the hierarchy of life. (Barbieri 2003b: 247)

Biosemiotics is also inseparable from a renewed reflection on the question of the origin of language, as well as on the nature of language (see for example

Hoffmeyer, Emmeche 1991; Deacon 1997; Sharov 1999 and Barbieri 2010). Finally, biolinguistics and biosemiotics have a common stake, which is to overcome the divide between the humanities and the natural sciences. Chomsky naturalizes linguistics. As for biosemioticians, they assert the obsolescence of this opposition in the biosemiotic framework. For example, Kull (1999: 386) states that “what makes biosemiotics important and interesting for science in general is its attempt to research the origins of semiotic phenomena and, together with it, to pave a way of conjoining humanities with natural sciences, culture with nature”.⁷ Similar assertions can be found, in particular, in the writings of Jesper Hoffmeyer, who readily speaks of the resolution of dualism:

To modern science, dualism still holds good as a way of dividing the world into two kingdoms, those of mind and matter, the cultural and the natural spheres. [...] And it is this boundary that biosemiotics seeks to cross in hopes of establishing a link between the two alienated sides of our existence – to give humanity its place in nature. (Hoffmeyer 1996[1993]: 94)

This articulation between either linguistics (or semiotics) and biology is nonetheless achieved through two distinct paths: that of the construction of a total object, both, and indissolubly, linguistic and biological, for biolinguistics, and that of importation, which can also be seen as an extension of a principle of analysis – the sign –, for biosemiotics. In this respect, biosemiotics appears as a *semiotic* counterpart of generalized structuralism, of which it is also in some respects a development and a corollary.⁸ For its part, biolinguistics reaches biology in the framework of a development of the structural hypothesis which is at the heart of (European, but also American) structuralism. If the Peircean reference is common to both paradigms (see Augustyn 2009; 2013; see nevertheless Nöth 2015: 163–164), biosemiotics is characterized, unlike biolinguistics, by its rejection of the dyadic model of the sign in favour of the Peircean triadic model.⁹ This is the work, in particular, of Thomas Sebeok (see in particular Sebeok 1979; 1988; 1991).

⁷ See too, in particular, Emmeche, Kull (eds.) 2011: 39, 94; Emmeche 1991: 331–332.

⁸ Jakobson, in particular, can be considered as a transmitter in this respect; see also Emmeche, Kull 2011: 4ff.

⁹ Let us note, in that regard, this terminological remark by Kull, Emmeche and Hoffmeyer (2011: 12): “We devoted the remarks above to structuralism because a large part of structuralism has been strongly connected to semiology, whereas semiology can be seen as a certain part of semiotics. From a semiotic point of view, semiology is based on linguistic, dyadic and quite static models of sign relation, whereas semiotics stands on more general triadic and dynamic models. Therefore, identification of semiology with semiotics would be wrong. Semiological models represent the restricted special cases of semiotic models.”

The dyadic model is attributed to Saussure, who, in the words of Jui-Pi Chien (2015: 224), “has turned out to be one of the main obstacles” to the efforts of biosemiotics. In 1974, the biochemist Marcel Florkin (1974: 14) used “several general concepts elaborated by De Saussure such as significant [*sic*] and signified, synchrony and diachrony, syntagm and system with the special meaning they have in molecular biosemiotics”, and in 1977 Guido Forti attempted to make the fertility of the analogy between living beings and language appear fruitful, using Saussure’s concepts (Forti 1977). These two attempts were then widely criticized, with the aim of making it appear necessary to resort to Peircean semiotics. In “From language to nature – the semiotic metaphor in biology” Emmeche and Hoffmeyer (1991) criticized Forti’s analogy in detail, before affirming the appropriateness of the Peircean model (see Emmeche, Hoffmeyer 1991: 27ff). Whereas in “Is the cell a semiotic system?”, Barbieri opposes Florkin’s model, also mentioned in this text (see Emmeche, Hoffmeyer 1991: 22–24), both to the Peircean model used by Thomas Sebeok, and to the model developed by himself:

We have, in conclusion, three different definitions of a semiotic system and therefore three different models of the cell. The model of Saussure-Florkin describes the cell as a duality of genotype and phenotype. The model of Peirce-Sebeok describes it as a trinity of genotype, phenotype and *interpreter*. The ribotype model describes it as a trinity of genotype, phenotype and *codemaker*.¹⁰ (Barbieri 2007: 201)

In either case, Saussurean theory is completely unrecognized in its specificity, and this is a common point between biolinguistics and biosemiotics, as well as between biosemiotics and structuralism. The dyadic model invoked in these various publications is in fact the traditional definition of the sign, from which, as I shall endeavour to show in what follows, the Saussurean theorization of language has precisely broken away.

2. The Saussurean theorization of language

In an above-quoted article “From language to nature – the semiotic metaphor in biology”, Jesper Hoffmeyer and Claus Emmeche, before criticizing Guido Forti’s analogy, present “the concept of structure in the Saussurean tradition of linguistics” (Emmeche, Hoffmeyer 1991: 28). Thereafter, it reads:

¹⁰ See also Barbieri 2008: 45–47, for the opposition between the Peircean model and Barbieri’s trinity. Nöth emphasizes the proximity of Barbieri’s semiotics to that of Morris (see Nöth 2015: 161). The remarkable fact, however, from my point of view, is the rejection of the Saussurean model, as well as what I will describe below as a “semiotic perspective”. A.-G. T.

The language actually spoken among people in a language-community may well be the empirical point of departure for the linguist, but it is not the ultimate object of a structural linguistics. The spoken word (*parole*) is the individual's situation-embedded use of the language-system. This language system, *la langue*, is the underlying deeper structure, which has to be explored in the analysis. Actually, it is through a kind of methodological abstraction, separating the language system as such from the concrete act of speech performed by the individual, that the linguist can reveal the general, but immediately hidden, structure that makes up the language system. The elaboration of this structure requires a careful analysis of the component language signs and their mutual relations, to, on the one hand the acoustic image, the "expression" – or signifiant-aspect and, on the other, their "element of content", i.e., conceptual or signifié-aspect. The separate signifiés and signifiant's are only determined (identified) through their differential relationships to other signifiés and signifiant's. The whole language system is therefore a huge net of relations, in which a position in the network is determined by its difference from other positions. This language system always already exists, when individuals are speaking. That is, the language system structures the language use. There is, however, a feed back (or "dialectical") relation between language system and language usage, since the language system itself is changed through the process in which it is used, thus evolving. (Emmeche, Hoffmeyer 1991: 28)

Here, Saussure is considered to be the founder of structuralism, and his concept of system is equated with that of structure. Saussure would take his point of departure in speech in order to bring to light the linguistic structure of any given idiom, this structure being characterized by the mutual interdependence of its elements, presenting itself as an entity and made up of signs that can be analysed in signifier and signified, which can be considered separately. Now, as I have shown elsewhere (see in particular Toutain 2012; 2014; 2015a), while this doctrine is more or less – that is to say, in its broad outlines, and without taking into account the singularity of each elaboration – the structuralist doctrine, the Saussurean and structuralist problematics are radically different from each other. The structuralist notion of structure retains nothing of the Saussurean concept of system, and the Saussurean theorization of language (*la langue*) institutes a new definition of the sign, breaking with the traditional definition of the sign, which is that of common knowledge, and the one that structuralism takes up again.

In contrast to the opposition between *expression* and *element of content* that Jesper Hoffmeyer and Claus Emmeche highlight here, Saussure sets up a very different distinction between *sound* and *sign*. In what is probably Saussure's first text on general linguistics, "*De l'essence double du langage*" (1891), we can read the following:

Le dualisme profond qui partage le langage ne réside pas dans le dualisme du son et de l'idée, du phénomène vocal et du phénomène mental; c'est là la façon facile et pernicieuse de le concevoir. Ce dualisme réside dans la dualité du phénomène vocal COMME TEL, et du phénomène vocal COMME SIGNE – du fait physique, (objectif) et du fait physico-mental (subjectif), nullement du fait “physique” du son par opposition au fait “mental” de la signification. Il y a un premier domaine, intérieur, psychique, où existe le signe autant que la signification, l'un indissolublement lié à l'autre; il y en a un second, extérieur, où n'existe plus que le “signe”; mais à cet instant le signe réduit à une succession d'ondes sonores ne mérite pour nous que le nom de figure vocale. (Saussure 2002: 20–21)¹¹

The profound dualism which splits language (*langage*) is not rooted in the dualism of sound and idea, of vocal phenomenon and mental phenomenon; that is a facile and a dangerous way of conceiving of it. This dualism is rooted in the duality of the vocal phenomenon AS SUCH, and of the vocal phenomenon AS SIGN – of the (objective) physical reality and the (subjective) physical-mental reality, and not at all of the “physical” reality of sound as against the “mental” reality of meaning.¹² There is one domain, interior, psychic, where both sign and meaning are to be found, bound indissolubly one to the other; and there is another, exterior, domain, where only the “sign” is to be found, but in this case the sign reduced to a series of sound waves deserves in our view only the designation of vocal figure. (Saussure 2006: 6)

The sound is opposed not to the idea, but to the “sound-idea group”, according to the terms used in another manuscript, “*Notes pour un livre sur la linguistique generale, 2*” (1893–1894):

On a tant de fois opposé le son matériel à tout ce qui lui peut être opposé que nous craignons bien que notre nouvelle distinction ne soit confondue avec d'autres. Notre position est toutefois très nette. Parmi les choses qui peuvent être opposées au son matériel, nous nions, essentiellement et sans aucune défaillance future dans le détail, qu'il soit possible d'opposer l'idée. Ce qui est opposable au son matériel, c'est le groupe son-idée, mais absolument pas l'idée. (Saussure 2002: 202)

Material *sound* has so often been opposed to everything susceptible of being opposed to it, that we fear that our new distinction might be confused with others. Our position is, however, very clear. When considering what can be *opposed* to

¹¹ All quotations from this book have been checked against the manuscripts. The text may therefore differ from that of this publication.

¹² The translation has been modified where the translation seemed to us to reflect a misunderstanding of the Saussurean text, or in order to conform to the French manuscripts. The text quoted may thus differ from that of the publication (the corresponding fragments have been underlined), A.-G. T.

material sound, we rule out, in essence, and with no likelihood of modifying this view, the possibility of opposing sound and idea. What can be opposed to material sound is *the sound-idea group*, but certainly not *the idea*. (Saussure 2006: 139)

Sound and idea – or signifier and signified, no matter which terms are used, as long as the concept is the same – are the constituents of the sign taken as the starting point for the analysis. Sound and “sound-idea”, for their part, are objects constituted by two distinct points of view, which Saussure defines respectively as *phonological* and *linguistic*. At the origin of Saussure’s elaboration lies indeed a questioning of the given that Hoffmeyer and Emmeche set as its starting point, and which is effectively the starting point of the structuralist elaboration – as well as of most linguistic elaborations – but not of Saussure’s.¹³ In his texts of the early 1890s, Saussure insists on the absence, in linguistics, of any given object. In the “*Notes pour un livre sur la linguistique générale, 2*”, for example, we can read (but this type of assertion is recurrent):

Voici notre profession de foi en matière linguistique: En d’autres domaines on peut parler des choses “à tel ou tel point de vue”, certain qu’on est de retrouver un terrain ferme dans l’objet même. En linguistique, nous nions en principe, qu’il y ait des objets donnés, qu’il y ait des choses qui continuent d’exister quand on passe d’un ordre d’idées à un autre, et qu’on puisse se permettre de considérer des “choses” dans plusieurs ordres, comme si elles étaient données par elles-mêmes. (Saussure 2002: 201)

This then is our linguistic *profession de foi*. In other fields, things can be spoken “*from such and such a viewpoint*”, with the certainty of finding solid ground within the object itself. In linguistics we deny in principle that there are given objects, that there are *things* which continue to exist when we move from one notional framework to another, and that it is permissible to consider “things” in several frameworks, as if things were given by themselves. (Saussure 2006: 139)

¹³ It is worth recalling, in this respect, this Bachelardian reflection: “*Avant tout, il faut savoir poser des problèmes. Et quoi qu’on dise, dans la vie scientifique, les problèmes ne se posent pas d’eux-mêmes. C’est précisément ce sens du problème qui donne la marque du véritable esprit scientifique. Pour un esprit scientifique, toute connaissance est une réponse à une question. S’il n’y a pas eu de question, il ne peut y avoir connaissance scientifique. Rien ne va de soi. Rien n’est donné. Tout est construit.*” (Bachelard 2004[1938]: 16; “Above all, you have to know how to pose problems. And whatever one may say, in scientific life, problems do not arise by themselves. It is precisely this sense of the problem that gives the mark of the true scientific mind. For a scientific mind, all knowledge is an answer to a question. If there was no question, there can be no scientific knowledge. Nothing is self-evident. Nothing is given. Everything is constructed.”) What characterizes Saussurean linguistics, and forms its break with common knowledge, is above all this problematization of the given.

Such propositions testify to a radically new approach – instead of starting from the linguistic given: sounds, forms, words, syntagms, rules of syntax, idioms, etc., in order to study it in its materiality, its structuring, its nature, etc., as had been done until then, Saussure considers this very given *to be problematic*, and requiring theorization. He then promotes the notion of point of view, the importance of which must be clearly understood. It is not a question of points of view applied to a pre-existing object – since Saussure denies any existence to such an object – but of points of view constituting distinct objects, objects which thus become purely relative to a point of view, without any unity being able to subsume them. Thus we read, in particular, in “*De l’essence double du langage*”:

Après avoir dénommé un certain objet livré [par] le point de vue A, qui n’a d’existence absolument que dans l’ordre A, et qui ne serait pas même une chose délimitée hors de l’ordre A; – il est permis peut-être (dans certains cas) de voir comment se présente cet objet de l’ordre A, vu selon B. A ce moment est-on dans le point de vue A ou dans le point de vue B? Régulièrement il sera répondu qu’on est dans le point de vue B; c’est qu’on a cédé une fois de plus à l’illusion des êtres linguistiques menant une existence indépendante. La plus difficile à saisir, mais la plus bienfaisante des vérités linguistiques est de comprendre qu’à ce moment on n’a pas cessé au contraire de rester fondamentalement dans le point de vue A, du seul fait qu’on fait usage d’un terme de l’ordre A, dont la notion même nous échapperait selon B. (Saussure 2002: 23–24)

Having named a certain object, delivered [by] the point of view A, which has absolutely no existence except in the A order, and which would not even be a delimited thing outside the A order; – it is perhaps possible (in certain cases) to look at how this object of the order A is presented, as seen from the viewpoint of B. *In that instance, is one seeing things from viewpoint A, or viewpoint B?* Often the response will be that things are seen from the viewpoint B; this is because once again one has succumbed to the illusion that linguistic entities have an independent existence. The most difficult to grasp, but the most salutary, of linguistic truths, is to comprehend that in such a case one has on the contrary not ceased to remain basically within the A point of view, by the very fact that one is making use of a term of the A order, the very notion of which would escape us if seen from B. (Saussure 2006: 8)

In this perspective, in particular, there are no signs, in the traditional sense – Saussure takes the example, in his “*Notes pour un livre sur la linguistique générale, I*”, of *cantare* – signs that one could then consider from the phonological point of view, from the morphological point of view, from the semantic point of view, from the diachronic point of view, and, in particular, analyse in signifier and signified, sound or form and idea or meaning. There are only points of view that are constitutive of irreducible units, without any relation, strictly speaking, to each

other: the phonological unit, constituting a “vocal figure”, the “morphological” or “semiological” (synchronic) unit, constituting a sign, or the diachronic unit, constituting a phonetic unit (in the Saussurean sense, different from the one conferred on this term by postsaussurean phonology, in particular structuralist: i.e. in the sense that *k* is the same thing, in words like *campus* > *champ*, as the French *ch*). We can thus measure the stakes of the Saussurean substitution of the opposition between *sound* and *sign* to the traditional opposition between sound and idea: this opposition responds to the need to constitute the linguistic entity, which does not exist as such.

At this point we come to the central concept of the Saussurean theorization of language (*la langue*), namely the concept of value, which is inseparable from that of system. The notion of point of view is above all an epistemological notion, which refers to the need to construct (in the sense of a theorization) the given. The morphological, or semiological, or synchronic point of view is, however, the point of view defining language as a system of signs, with *sign* taken in the Saussurean sense. Thus we find in “*De l'essence double du langage*” other formulations of the inexistence, in linguistics, of any given object, of any “thing”, i.e. of any entity with an objectal existence (comparable, *mutatis mutandis*, to that of an object, in the sense usually given to this term), some of which are somewhat different from the one I have quoted above. For example:

Dans d'autres domaines, si je ne me trompe, on peut parler des différents objets envisagés sinon comme de choses existantes elle[s]-mêmes du moins comme de choses qui résument choses ou [?] entités positives (à moins peut-être de pousser les faits jusqu'aux limites de la métaphysique, ou de la question de connaissance; ce dont nous entendons faire complètement abstraction); or il semble que la science du langage soit placée à part: en ce que les objets qu'elle a devant elle n'ont jamais de réalité en soi, ou à part des autres objets à considérer; n'ont absolument aucun substratum à leur existence hors de leur différence ou en LES différences de toute espèce que l'esprit trouve moyen d'attacher à LA différence fondamentale: mais sans que l'on sorte nulle part de cette donnée fondamentalement et à tout jamais négative, de la DIFFÉRENCE de deux termes, et non des propriétés d'un terme. (Saussure 2002: 65)

In other fields, unless I am mistaken, one can speak of the various objects considered, if not as things that can be said to have their own existence, at least as things which sum up things or [?] positive entities (unless perhaps one pushes the facts to the limits of metaphysics, or of the question of knowledge; which we intend to ignore completely); now it seems that the science of language is set apart: in that the objects it has before it never have any reality in themselves, or apart from the other objects to be considered; have absolutely no substratum for their existence apart from their difference or in THE differences of any kind that the mind

finds a way of attaching to THE fundamental difference: but nowhere do we get out of this fundamentally and forever negative datum, of the DIFFERENCE of two terms, and not of the properties of a term. (Saussure 2006: 42)

Again, in this passage we can find the affirmation of a singularity of linguistics across the sciences, due to a particular way of existence of its object, which is not that of “things”. Saussure, however, opposes here given point of view less than he did in the affirmation of the “*Notes pour un livre sur la linguistique générale, 2*”, that he defines, for linguistic entities, a specific mode of existence, opposing that of these “things or positive entities” as purely negative and differential. This is precisely the mode of existence of values, which are not positive entities, but on the contrary purely oppositional, relative, negative entities, according to a well-known formulation of the *Cours de linguistique générale*. As it appears in the presentation of Claus Emmeche and Jesper Hoffmeyer, the structuralists have retained from this formulation only the first two adjectives. However, it is the third – *negative* – that specifies the Saussurean conception, insofar as it indicates the break with the objectal conception that we have just seen. Thus we can also read in “*De l’essence double du langage*”:

Il n’y a dans la langue ni signes, ni significations, mais des DIFFÉRENCES de signes et des DIFFÉRENCES de signification; lesquelles 1° n’existent les unes absolument que par les autres, (dans les deux sens), et sont donc inséparables et solidaires ; mais 2° n’arrivent jamais à se correspondre directement.

D’où l’on peut immédiatement conclure: que tout, et dans les deux domaines, (non séparables d’ailleurs) est NÉGATIF dans la langue, – repose sur une opposition compliquée, mais uniquement sur une opposition, sans intervention nécessaire d’aucune espèce de donnée positive.

[...]

[...] nous persistons à dire que la langue ne s’alimente et ne vit que d’un ensemble [d’]oppositions, d’un ensemble de valeurs parfaitement négatives et n’existant que par leur contraste mutuel. (Saussure 2002: 70–71)

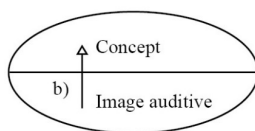
Langue contains neither signs nor significations, but DIFFERENCES of signs and DIFFERENCES of significations; which (1) exist absolutely only through each other, (in both directions), and are hence inseparable and interdependent; but (2) can never correspond directly.

This leads straight to the conclusion that everything in language, and in both domains (which are, of course, not separable) is NEGATIVE, – is based on a complicated opposition, but only on an opposition, without the necessary intervention of any kind of positive data.

[...]

[...] we persist in saying that language feeds and lives only by a set of oppositions, a set of values that are perfectly negative and exist only through their mutual contrast. (Saussure 2006: 46–47)

In this early text, signs and meanings designate the signifiers and the signified, respectively, and Saussure thus affirms that these have a purely differential existence, and, moreover, that this differential existence is inseparable from their combination, which is constitutive of the sign. The concept of value in fact implies an equivalence, an inseparability of the horizontal axis of the delimitation and vertical axis of the combination. This is what Saussure explains in particular in the third course of general linguistics (1910–1911), in the chapter “*Valeur des termes et sens des mots*”, which is quite remarkable from an epistemological point of view. Saussure starts from the traditional schema of the sign, the one found in the *Cours de linguistique générale* because he himself took it up in this third course:



<La flèche marque signification comme contrepartie de l'image auditive>.

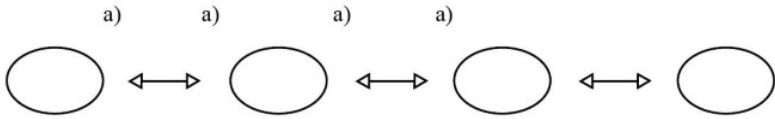
Dans cette vue, la signification est la contrepartie de l'image auditive et rien d'autre. Le mot apparaît ou est pris comme un ensemble isolé et absolu. – intérieurement, il contient l'image auditive ayant pour contrepartie un concept. (Saussure, Constantin 2005: 282)

<The arrow indicates meaning as counterpart of the auditory image>

In this view, the meaning is the counterpart of the auditory image and nothing else. The word appears, or is taken as, an isolated, self-contained whole; internally, it contains the auditory image having a concept as its counterpart. (Saussure 1993: 135a)

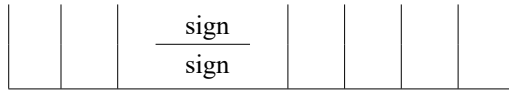
However, he endeavours to demonstrate that this schema “*n'est [...] pas initial dans la langue*” (Saussure, Constantin 2005: 287) [“is not the starting point in the language” (Saussure 1993: 140a)], that it “*n'est pas un schéma primitif*” (Saussure, Constantin 2005: 287) [“is not a primary schema” (Saussure 1993: 141a)]. Indeed, it goes on to say:

Voici le paradoxe, en langage baconien “la caverne” contenant un piège, c'est que la signification qui nous apparaît comme la contrepartie de l'image auditive est tout autant la contrepartie des termes coexistants dans la langue. Nous venons de voir que la langue représente un système où tous les termes apparaissent liés par des rapports:



Au premier abord, pas de rapports entre flèches a) et flèches b)

La valeur d'un mot ne résultera que de la coexistence des différents termes... La valeur est la contrepartie des termes coexistants. Comment cela se confond-il avec <ce qui est contrepartie de l'image auditive? Autre figure: série de cases:



Le rapport à l'intérieur d'une case et entre les cases est bien difficile à distinguer>

La signification comme contrepartie de l'image et la signification comme contrepartie des termes coexistants se confondent. (Saussure, Constantin 2005: 282–283)

The paradox – in Baconian terms the trap in the “cave” –, is this: the meaning, which appears to us to be the counterpart of the auditory image, is just as much the counterpart of the terms coexisting in the language. We have just seen that the language represents a system in which all the terms appear as linked by relations.

At first sight, no relation between the a) and the b) arrows. The value of a word will be the result only of the coexistence of the different terms. The value is the counterpart of the coexisting terms. How does that come to be confused with the counterpart of the auditory image[?]

Another diagram: series of slots: <The relation inside one slot and between slots is very hard to distinguish>

The meaning as counterpart of the image and the meaning as counterpart of coexisting terms merge. (Saussure 1993: 135a)

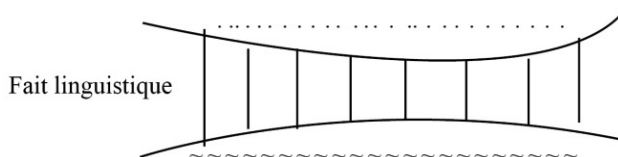
Against this traditional definition of the sign as a combination of a signifier and a signified, Saussure posits the inseparability of the two axes, which imposes the redefinition of signification as being at the same time, and inseparably, “counterpart of the image” and “counterpart of the coexisting terms”. The combination which is constitutive of the sign is thus redefined as “delimitation-combination”. Indeed, it is not a question of adding the delimitation to the combination (this would be the structuralist position, the notion of relativity), but of defining the combination as delimitation. The combination between thought and speech produces delimitations of units, while these delimitations only intervene through this combination. There is therefore no delimitation *and* combination, but delimitation-combination, and the sign, defined as a value, is not a constitutive entity of language, usable as

such to express oneself, to communicate (the usual definition of language as an instrument of communication), but it is this point of view discussed above, it is this delimitation-combination that occurs at every moment when one speaks, thinks, reads, writes, listens, etc., and in which language consists. Thought comes into play a little later in this chapter of the third course, when Saussure indicates that if he had chosen, “[p]our arriver à l’idée de valeur” (Saussure, Constantin 2005: 285; “to reach the idea of value”), “de partir du système de mots par opposition au mot isolé” [Saussure, Constantin 2005: 285; “to start from the system of words as opposed to the word in isolation” (Saussure 1993: 137a)], he could have chosen “de partir d’une autre base” [Saussure, Constantin 2005: 285; “a different basis to start from” (Saussure 1993: 137a)]. Indeed, we read then:

Psychologiquement, que sont nos idées, abstraction faite de la langue? Elles n’existent probablement pas, ou sous une autre forme qu’on peut appeler amorphe. Nous [n]aurions <d’après philosophes et linguistes> probablement <pas> le moyen de distinguer <clairement> deux idées sans le secours de la langue (langue intérieure naturellement).

Par conséquent, prise en elle-même, la masse purement conceptuelle de nos idées, la masse dégagée de la langue représente une espèce de nébuleuse informe où l’on ne saurait rien distinguer dès l’origine. Aussi donc réciproquement pour la langue, les différentes idées ne représentent rien de préexistant. Il n’y a pas: a) des idées qui seraient toutes établies et toutes distinctes les unes en face des autres, b) des signes pour ces idées. Mais il n’y a rien du tout de distinct dans la pensée avant le signe linguistique. Ceci est le principal. D’un autre côté, il vaut aussi la peine de se demander si en face de ce royaume des idées tout à fait confus le royaume du son offrirait d’avance des unités bien distinctes (pris en lui-même en dehors de l’idée).

Il n’y a pas non plus dans le son des unités bien distinctes, circonscrites d’avance. C’est entre deux que le fait linguistique se passe.



Ce fait <linguistique> donnera naissance à des valeurs qui elles <pour la première fois> seront déterminées, mais qui n’en resteront pas moins des valeurs, avec le sens qu’on peut attacher à ce mot. (Saussure, Constantin 2005: 285)

Psychologically, what are our ideas, apart from our language [?] They probably do not exist. Or in a form that may be described as amorphous. We should probably be unable <according to philosophers and linguists> to distinguish two ideas <clearly> without the help of a language (internal language naturally).

Consequently, in itself, the purely conceptual mass of our ideas, the mass separated from the language, is like a kind of shapeless nebula, in which it is impossible to distinguish anything initially. The same goes, then, for the language: the different ideas represent nothing pre-existing. There are no: a) ideas already established and quite distinct from one another, b) signs for these ideas. But there is nothing at all distinct in thought before the linguistic sign. This is the main thing. On the other hand, it is also worth asking if, beside this entirely indistinct realm of ideas, the realm of sound offers <in advance> quite distinct ideas (taken in itself apart from the idea).

There are no distinct units of sound either, delimited in advance.

The linguistic fact is situated in between the two:

This <linguistic> fact will engender values which <for the first time> will be determinate, but which nevertheless will remain values, in the sense that can be attached to that word. (Saussure 1993: 137a-138a)

Here, Saussure adopts a perspective that can at first be characterized as ontogenetic: placing himself before the appearance of language, he characterizes thought and speech as “amorphous masses”, which allows him to define the “linguistic fact” as the “coupling (*accouplement*)”¹⁴ of these two masses, leading to a delimitation of units which explains the existence of signs, in the common sense of this term – because in the scientific sense, they are values. Perhaps the simplest way to imagine things from this new perspective is effectively to turn to ontogenesis. At birth, in the human infant, thought is a kind of confused mass of sensations and perceptions. However, little by little, little bits of thought become isolated, because they are articulated to signifiers heard in the speech of those around them, a delimitation inseparable from a combination. This is what happens in us at every moment, from that first moment in the first months of our lives, except that these delimitations-combinations no longer need the word of the other, which we have made our own in a way. It is, moreover, this appropriation that gives us the illusion that there is something like signs, that we have our language as an instrument. In reality, our “use” of language is a succession of advents of signs, of delimitations-combinations, which are only socially coded, determined by transmission (at the beginning) and communication (during life), what Saussure, in the second course, calls “*vie sémiologique*”.¹⁵

¹⁴ This term appears in the second course (see Saussure 1997: 22).

¹⁵ See Saussure 1997: 11–12. In this respect, I cannot agree with what Emmeche and Hoffmeyer (1991: 28–29) say in their article: “Language usage is not (even in Saussure) a simple effect of ‘la langue’: the system is not changed by the individual usage as such, but through the community, which the language as an institution helps to form. However, this concept of social praxis, which becomes crucial if one wants to understand the proper establishment and change of the language system, is missing in Saussure. Social praxis is obviously a part of the

This “coupling”, this “linguistic fact”, was more precisely characterized in the second course:

[...] le rôle <caractéristique> du langage vis-à-vis de la pensée ce n'est pas <d'être> un moyen phonique, matériel mais c'est de créer un milieu intermédiaire de telle <nature> que le compromis entre la pensée et le son aboutit d'une façon inévitable à des unités <particulières.> La pensée de sa nature chaotique est forcée de se préciser parce qu'elle <est> décomposée, elle est répartie par le langage en des unités. Mais il ne faut pas tomber dans l'idée banale que le langage est un moule: c'est le considérer comme quelque chose de fixe, de rigide alors que la <matière phonique est aussi> chaotique en soi que la pensée. <Ce n'est pas du tout cela: ce n'est pas la matérialisation de ces pensées par un son qui est un phénomène utile,> c'est le fait <en quelque sorte> mystérieux que la pensée-son implique des divisions qui sont les unités finales de la linguistique. (Saussure 1997: 21)

[...] the <characteristic> role of language with respect to thought is not <to be> a phonic, material medium, but rather is to create an intermediary environment of such <a nature> that the compromise between thought and sound inevitably ends up in <specific> units. Thought in its chaotic nature is forced to take shape because it <is> taken apart, divided up by language into units. But we must not fall into the banal idea that language is a mould: this is to consider it as something fixed, rigid whereas <phonic matter is just as> chaotic in itself as is thought. <This is not it at all: it is not the materialization of these thoughts by a sound which is a useful phenomenon,> it is the <in some sense> mysterious fact that the thought-sound implies divisions which are the final units of linguistics. (Saussure 1997: 21a)

A few lines further down in this course, Saussure (1997: 22/22a) states that “[l]e terrain de la linguistique est le terrain commun <qu'on pourrait appeler dans un sens très large le terrain> des articulations, c'est-à-dire des 'articuli', des petits membres dans lesquels la pensée prend conscience <(valeur? B.)> par un son” [“The terrain of linguistics is the common terrain <which we could call in a very broad sense the terrain> of articulations, i.e. of *articuli*, of small members in which thought becomes self aware <(takes on value? B.)> through a sound.”] To the concept of value, which makes the sign the effect of a delimitation, an entity that can be considered as positive but which is, as such, only the result of an interplay of negative values, thus responds a radically new definition of language. Language

larger reality that language is embedded in, but which structuralism seldom deals with in its methodological closure around the always already existing structure.” The social dimension is indeed central to the Saussurean definition of language (*la langue*): the social character constitutes the exteriority of language (*la langue*), the non-objective exteriority of a language (*la langue*) defined as a functioning (see Toutain 2014).

(*la langue*), in Saussure's theory, is not a system of signs, in the structuralist sense, that is, in an objectal sense, of a set of positive entities, even if they are relative, but is defined as 'articulation', 'division-combination', all terms to be understood as names of actions, designating this "mysterious fact that thought-sound implies divisions that are the final units of linguistics". In other words, language (*la langue*) is defined by Saussure as a functioning, of which sound and meaning, as linguistic, and with them signs and idioms (that is to say, all specific existing languages), are the effects. This is how the statement that the traditional schema of the sign "is not initial in the language" is to be understood, it seems to me. The result of this functioning is a set of linguistic entities (words, grammar rules, etc.) that can be recorded in dictionaries and grammars, and which are the signs of the traditional representation. Nevertheless, these linguistic entities do not constitute the language (*la langue*); on the contrary, it is the language (*la langue*) that institutes them, the language (*la langue*) of which they are only the manifestation. The definition of language (*la langue*) as a functioning appears very clearly, notably in this often quoted passage from "*De l'essence double du langage*", where Saussure describes very precisely the relations of negativity and positivity that are constitutive of this definition of language (*la langue*):

Le phénomène d'intégration (ou de post-méditation)-réflexion est le phénomène double qui résume toute la vie active du langage, et par lequel

1° les signes existants évoquent MÉCANIQUEMENT, par le simple fait de leur présence et de l'état toujours accidentel de leurs différences à chaque moment de la langue, un nombre égal non pas de concepts, mais de valeurs opposées pour notre esprit (tant générales que particulières, les unes appelées par exemple catégories grammaticales, les autres taxées de faits de synonymie, etc.); cette opposition de valeurs qui est un fait purement NÉGATIF se transforme en fait positif, parce que chaque signe, en évoquant une antithèse avec l'ensemble des autres signes comparables à une époque quelconque, en commençant par les catégories générales et en finissant par les particulières, se trouve être délimité, malgré nous, dans sa valeur propre. (Saussure 2002: 87–88)

The phenomenon of integration (or post-meditation)-reflection is the dual phenomenon which sums up the whole of the active life of language, and by which

(1) existing signs MECHANICALLY evoke, by the simple fact of their presence and of the always accidental state of their *differences* at every moment of the language, an equal number not of concepts, but of values opposed for our mind (whether general or particular, some called for example grammatical categories, others called facts of synonymy, etc.); this opposition of values, which is a purely NEGATIVE fact, becomes a positive fact, because each sign, by evoking an antithesis with the whole of the other comparable signs at any given time, starting with the general categories and ending with the particular ones, finds itself delimited, in spite of ourselves, in its own value. (Saussure 2006: 60)

We can thus measure the contribution of Saussurean theory to linguistics: the empiricism that consists in starting from the given idioms is replaced by a theorization, a definition of language (*la langue*) that gives reason for the existence of this given. Indeed, I spoke earlier of an “ontogenetic perspective”. However, we can now see that the Saussurean perspective, in these two developments of the second and third courses,¹⁶ is more precisely theorizing: this “theoretical fiction”, as it can be called, does not envisage a genesis, but constructs language (*la langue*) as the reason for the linguistic given: sound, meaning, signs and idioms. The singularity of Saussure, in the history of linguistics, is therefore this theorizing problematic, allowing a linguistic *construction* of the given, identified as problematic, and thus allowing the theorizing of the sound/meaning relationship and a definition of language (*la langue*) which explains the existence of idioms (again, that is to say, all specific existing languages). From this perspective, what about semiotics?

3. Biosemiotics as “scientific ideology”

Saussure’s theorization of the sign is connected to an inscription of linguistics within the framework of a larger science, which Saussure calls *semiologie*. Thus, we read in particular in the third course (see also Saussure, Constantin 2005: 89, as well as Saussure 1997: 7, 9–10):

Au-delà de ces caractères <de ce dépôt d’images acoustiques> un nouveau caractère se présente <et bienvenu>: une fois la langue dégagée de ce qui ne lui appartient pas, elle apparaît comme classable parmi les faits humains. C’est un système de signes reposant sur des images acoustiques <association d’une idée avec un signe, c’est ce qui fait l’essence de la langue>. D’autres systèmes de signes: ceux de l’écriture, signaux maritimes, langue des sourds-muets. Tout un ordre de faits psychologiques (de psychologie sociale) qui ont droit d’être étudiés comme un seul ensemble de faits. Compartiment dans la psychologie: la sémiologie (études des signes et de leur vie dans les sociétés humaines). (Saussure, Constantin 2005: 218)

Over and above these features <of this repository of acoustic images>, another feature emerges <and is welcome>: once the language is stripped of everything that does not belong to it, it appears as classifiable among human facts. It is a system of signs based on acoustic images.

<Association of an idea with a sign, that is what the essence of the language is>.

¹⁶ Taken up, with notable fidelity, in the *Cours de linguistique générale*, where they are compiled to form the first paragraph of the fourth chapter of the second part of this book, appropriately entitled “*La langue comme pensée organisée dans la matière phonique*” (see Saussure 1995[1972]: 155–158, and for the students’ notes, 1974[1967]: 251–257).

Other systems of signs: those of writing, maritime signals, the language of the deaf-and-dumb. A whole order of psychological facts (of social psychology) which deserve to be studied as one set of facts.

Compartment in psychology: semiology (studies of signs and of their life in human societies). (Saussure 1993: 71a)

The relationships established by Saussure between linguistics and semiology are nevertheless extremely ambivalent, insofar as Saussure inscribes linguistics in semiology, while making the latter the model for the former (see in particular Arrivé 2007: 88–100; Chiss, Puech 1992: 8–11; Bouquet 1997: 190–199 and Fehr 2000: 108–113, as well as Toutain 2015b and 2014: 320–344). This ambivalence is compounded by a contradiction: while *semiology*, which is bound up with a redefinition of the sign that breaks with common knowledge – the Saussure definition – can be contrasted with *semiotics*, which is based on the traditional definition of the sign, the semiotic problematics is far from being absent from Saussure's texts (see again Toutain 2014: 320–344). So it is symptomatic of the persistence of the epistemological obstacle of the sound/meaning relationship, which thus insists at the heart of its theorization. Nevertheless, it is also an effect of the nature of language as defined by Saussure: while the Saussurean definition of language implies a radical discontinuity, the very notion of the science of sign systems – hence semiology as well as semiotics – is essentially continuist; this is why the relationships between linguistics and semiology can only be ambivalent, an ambivalence that is perhaps irremediable or, more precisely, reducible in the terms of the Saussurean distinction between language (*la langue*) and idioms alone. This radical discontinuity stems from the fact that language (*la langue*), as the “articulation of thought in phonic matter”, institutes by its advent – phylogenetically as well as ontogenetically – a new space: the space of language (*langage*), which can also be characterized as a semiological world. In other words, semiology is an effect of language (*la langue*), as Roland Barthes well understood when he proposed to subordinate semiology to linguistics (see Barthes 1964: 1–2 and 1983[1967]: 9).

The continuity of the semiotic problematics is illustrated in exemplary fashion by structuralist semiotics, which, on the contrary, subordinates linguistics to semiology, reaching the specificity of language by means of a typology of signs. The systems of signs are no longer language (*langage*) modalities – language (*la langue*) effects – but become manifestations of a semioticity that remains without etiology, and without any definition other than the one that provides the framework for the analysis. Biosemiotics belongs to the same problematics, but the issues at stake are distinct, insofar as, because of the very nature of the object – the living –, it is a framework for thinking the specificity of man as *homo loquens*. The

discontinuity introduced by the Saussurean theorization of language (*la langue*) is indeed twofold: in the semiotic order, with this subordination of the semiological to the linguistic, breaking the continuity of a typology; and in the biological order, insofar as the Saussurean definition of language places *homo loquens*, which is no other species than *homo sapiens*, at the confluence of the logic of the living and the logic of language.

At the end of “Introduction: An evolutionary history of biosemiotics”, Donald Favareau insists on the need for a change of point of view in biology, which legitimates the sign, thus allowing new questions to be asked. As concerns the “current status of the ‘sign’ as a legitimate ‘unit of analysis’ in biology, and particularly in neurobiology” (Favareau 2010: 23), he thus claims:

There – as in genetics, as in pharmacology, and as in animal behavior study – if one is not looking for the biological construction of a “sign relation” per se within the set of material interactions that constitutes brain activity, then one can see all the chemical electrical activity there is to be seen – but one will never know how to see it as any particular kind or category of “sign activity” until one has a provisional theory – or articulation – positing in just what a “biological sign relation” consists. Even the finest microscope can only present – it cannot “make sense of” or explanatorily “reveal”. For that one needs a theory – i.e., is an articulation, based on the logical analysis of observed phenomena, which is then subject to informed scientific testing.

Without this, for example, neuronal activation may be mapped down to the nanovolt, for its chemical and electrical properties – which we already understand quite well today – are not going to change. (Favareau 2010: 63–64)

Biosemiotics therefore invites a semiotic reconstruction of biology. The remarkable fact is that this reconstruction is correlative both to an importation of semiotic concepts and to a naturalization of the sign. Indeed, Favareau (2010: 64) continues:

But whether or not we ever even look to see if any particular neuron’s activation is currently functioning as part of an indexical circuit, an iconic one, or a symbolic one – to such questions, we will never get an answer, so long as “sign processes” remain misunderstood as equivalent to “human cultural constructs” and not the fundamental biological relations that biosemiotics insists that they are.

It is also in this way that one can interpret Barbieri’s rejection of the coextensiveness of semiosis and interpretation, which leads Barbieri to distinguish different types of semiosis, of which Peirce-Sebeok’s interpretative semiosis thus becomes a mode. In particular, “Life is semiosis: The biosemiotic view of nature” reads as follows:

The idea that semiosis is based on interpretation not only in animals but in all living creatures, implies that semiosis is always an “interpretive” process, that semiosis is exclusively a means of interpreting the world, and this is a very severe limitation, because it means life would get only a partial contribution from semiosis. Life is essentially about three things: (1) it is about manufacturing objects, (2) it is about organizing objects into functioning structures, and (3) it is about interpreting the world. The idea that these are all semiotic processes, tells us that life depends on semiosis much more deeply and extensively than we thought. We realize that there are three distinct types of semiosis in Nature and that interpretive semiosis is only one of them. It is about time therefore that we come to terms with the existence of manufacturing semiosis and associative semiosis in all forms of life, and realize that they actually are the preconditions for the origin of interpretive semiosis in animal life. (Barbieri 2008: 47)

The aim is then to re-establish a continuity between living beings and language. Biosemioticians stress the need to take the linguistic metaphors used in biology seriously. The second of the eight “theses on biosemiotics” by Kalevi Kull, Terrence Deacon, Claus Emmeche, Jesper Hoffmeyer and Frederik Stjernfelt (2011: 28) is thus formulated as follows: “Biology is incomplete as a science in the absence of explicit semiotic grounding”, and the authors comment:

The neodarwinian biology as practiced all over the world has prescind (i.e., abstracted from necessary contextual support) an asemiotic conception of life as mere molecular chemistry, and yet at the same time is dependent on unanalyzed semiotic assumptions. The reason why this is not felt as a problem is that biology compensates for the excluded semiosis by introducing a plethora of implicitly semiotic terms like “information”, “adaptation”, “signal”, “cue”, “code”, “messenger”, “fidelity”, “cross talk”, etc. These uses are seldom well defined, and are often applied in an allegedly metaphoric way, with the implicit assumption that they can be reduced to mere chemical accounts if necessary.

It is not clear, however, that a complete and unproblematic reduction of this sort is possible. If biologists were asked to avoid these implicitly semiotic terms they would have a hard – and probably impossible – job of explaining the nature of organic function. (Kull *et al.* 2011: 28–29)¹⁷

The example given is that of hemoglobin, whose three-dimensional structure is incomprehensible without reference to its function, what the authors interpret in terms of relational existence and representation, and therefore of sign:

Another way to put this is to say that hemoglobin function is not intrinsic to its molecular structure. Rather it is relational – hemoglobin may be seen as a

¹⁷ In particular, see also the third chapter of the same book, by Jesper Hoffmeyer.

carrier of *constitutive absence* (Deacon 2006 [...]), in the sense that the molecule's properties are constituted not only by intrinsic features, but by extrinsic features of its historical and physical functional contexts. In effect, the missing oxygen with respect to which hemoglobin structure has evolved has become its defining characteristic. In this respect, one can understand the structure of hemoglobin as a "representation" of both oxygen and its role in the cellular molecular processes of metabolism. The function of hemoglobin is in this way also what affords the possibility of it having representational character. This function relates to the "needs" or self-maintenance conditions of some agent. Needing something implies both its transient absence and some structure or processual state representing that absence and its possible ending or completion.

This constitution with respect to something extrinsic and/or absent shows that function and representation are two aspects of the same mode of relational existence. This implies that the primary unit of biosemiotic research is a sign, not merely a molecule or cell. (Kull *et al.* 2011: 29–30)

The biosemiotic thesis contrasts as such, for the authors cited here, with "neo-darwinism", as well as with physico-chemical reductionism. In many texts the opposition between mechanism and vitalism is called for, with biosemiotics appearing as a third way, closer, however, to the vitalist position. For example, in "Biology is immature biosemiotics" by Jesper Hoffmeyer, we can read the following:

One reason why biologists, and scientists in general, so vehemently oppose any claim to the effect that natural selection might not be a sufficient explanation for evolution on Earth, is the belief that the theory of natural selection is the very element that glues biology to materialistic science. The disquieting fact that the creatures of this world so clearly exhibit purposeful behavior has always tempted philosophically minded biologists to claim the existence of peculiar vital forces or principles pertaining to life. It is probably no longer possible to make a career in biology at the university level if you adhere to such vitalist ideas, but biologists still have to somehow cope with the obvious, though tabooed, teleological aspect of life. (Hoffmeyer 2011: 43–44)

Whereas Barbieri¹⁸ (2003b: 244) writes in "Biology with information and meaning":

The century old battle against vitalism was fought, and won, precisely on the issue that life obeys the ordinary laws of physics. This is the strength of the physicalist thesis, and we must accept that biological information can be a real natural entity only if we discover that it is essential for the coming into being of an entirely new realm of molecules. This is the point which lies at the heart of the problem

¹⁸ That Favareau, however, calls "mechanist" (see Note 5). I will return to this issue below.

of biological information, and it is precisely this point, as we will see, that the physicalists have overlooked.¹⁹

Indeed, as unanimously asserted, what is at stake in the biosemiotic thesis is the definition of life. In “Life is semiosis: The biosemiotic view of nature” Barbieri (2008: 30) thus states:²⁰

The question “What is Life?” has become virtually equivalent to “What was the origin of Life?”, and for a long time it has been assumed that there are only two main answers. Life started either with primordial genes or with primordial proteins, which is equivalent to saying that life is either replication or metabolism.

And yet a third answer does exist. It is the idea that “life is semiosis”, i.e., that life is based on signs and codes. This idea has been strongly suggested by the discovery of the genetic code, but it has never been accepted by modern biology because it goes against some of its most basic concepts. Here, however, we want to show that organic codes and organic semiosis are, first and foremost, experimental facts, and we simply cannot ignore them, even if their existence requires a new theoretical framework. The idea that “life is semiosis” is precisely that – a new paradigm that accounts for the existence of organic codes in the living world and for their contribution to the origin and the evolution of life.

“Life is semiosis” is also the thesis defended by Thomas Sebeok (see, for example, Sebeok 1988: 81). The Copenhagen and Tartu schools took it up again, calling it “Sebeok’s thesis” (see for example, Emmeche, Kull [eds.] 2011: 69) and presenting it as the first of the eight theses of biosemiotics: “The semiotic/non-semiotic distinction is co-extensive with life/non-life distinction, i.e., with the domain of general biology” (Kull *et al.* 2011: 27). This statement is not exempt from questioning, as can be seen in the development of this thesis, where the notion of “threshold zone” is promoted and where the authors acknowledge that “it is unclear whether these two properties of living processes (function and semiosis) are exactly co-extensive”:

If we conceive of a function as a process organized around an implicitly represented end, then these two classes of phenomena must be considered entirely co-extensive. Alternatively, semiosis, the activity of sign processes, may be considered only in conditions where there is explicit or implicit representation of an end state or where a functional satisfaction condition can be identified as holding or not holding, in which case semiosis can be defined with respect to prior function. (Kull *et al.* 2011: 27)

¹⁹ See too, for example: Braga 1999: 497; Emmeche, Hoffmeyer 1991: 2–4; Kull *et al.* 2011: 31–32; Forti 1977: 78.

²⁰ See also Barbieri 2003b: 245–246.

Also Emmeche (1992: 78) stated, for example, in “Modeling life: A note on the semiotics of emergence and computation in artificial and natural living systems”, that “the emergence of semiosis in nature [...] may coincide with or anticipate the emergence of living cells”. Nevertheless, the question of the definition of life remains at the heart of these biosemioticians’ problematics. It goes hand in hand with the question of the emergence of the symbolic species that man is. As Favareau (2010: 41) notes:

And it was precisely the mystery of how and why it is that human beings have become such “savants” in the use of thirdness, while the majority of other species have not, that drove Sebeok to search beyond the elegant theoretical logic of Peirce and into the cacophonous real world of animals and their sign behavior.

The chapter “Biosemiotic research questions” by Kalevi Kull, Claus Emmeche and Donald Favareau in *Towards a Semiotic Biology. Life is the Action of Signs*, similarly insists on the necessity of biosemiotics for a better understanding of the human being:

[...] a more qualitative form of the “organistic” framework is achieved, integrating the rich findings of non-semiotic research within an expanded (or extended) biology that can and will undertake the inquiry into the underlying “science of signs”. For only within such a new biology can phenomena such as organic “qualia” be comprehended, including the qualitative organic relations characteristic of the human species.

This is so because, in the modern epoch of scientific research, the human species has been considered as, on the one hand, a strangely unique creature in the sense of having special access to reality through language and science, and of being capable of making objective descriptions of the world – and, on the other hand, as simply one species among others within the long and continuous history of evolution. As we see it, biosemiotics is an approach to the life sciences that makes it possible to unify these two apparently contradictory images of human beings and their place in nature. (Kull, Emmeche, Favareau 2011: 84–85)

Biosemiotics thus appears as an attempt to grasp and inscribe within biology what escapes matter: first of all, life, and, secondly, thought. This is what Favareau (2010: 6) expresses very clearly, for the second point, when he says that “in the study of biological organization and agency of every kind, it is precisely the naturalistic establishment of sign relations that ‘bridges’ subject-dependent experience (such as we find both in animal sensations as well as in human ‘mindedness’) with the inescapable subject independent reality of alterity – an alterity that all organisms have to find some way to successfully perceive and act upon in order to maintain themselves in existence”, or that “the world of sign relations per se did not start

with the advent of *homo sapiens* – and [...] a sign relation is not something that was created *ex nihilo* by the minds of human beings – but rather, [...] the minds of human beings are themselves the product of a *de novo* use of absolutely natural and biological sign relations” (Favareau 2010: 9), as well as by distinguishing three stages in the emergence of biosemiotics: “Semiotics without science”, “Science without semiotics” and “Science with semiotics”, the second being the one inaugurated by Cartesian dualism and thus appearing as a “reductionist” phase. He then speaks, significantly, of *proto-science*:

The sign relation of “standing for” is ubiquitous in the biological world, but the resistance to studying sign processes in nature as genuine sign processes – as opposed to just studying the interactions of their material substrates – has a long and principled history in science. It is precisely this history that we need to understand first, if we are ever to understand how something as oddly named as “biosemiotics” has emerged as neither not an anti-science nor a pseudo-science, but as a genuine proto-science aimed at scientifically distinguishing and explaining the use of sign processes and sign relations both between and within organisms. (Favareau 2010: 2)

As I have already indicated above, the remarkable fact is that this proto-science which, as we have seen above, and as it appears again here, allows the overcoming of the opposition between nature and culture, “hard” sciences and human sciences, rests at the same time on a *naturalization of the sign* – which common knowledge and reductionist science mistakenly attribute to humans and their thought: to culture, as opposed to nature, but whose biosemiotics asserts its natural character – and, by this very fact, on the import of a concept external to biology: that of *semiosis*, capable of allowing the establishment of such a continuity. Favareau (2010: 32; my emphasis, A.-G. T.) also asserts along these lines:

What particular relations in the naturally occurring world does human symbolic understanding exploit differently, say, than primate indexical understanding does, or that the iconic relations chemotaxis affords for the amoeba? Are the earlier processes still at work in the later ones? How much and what kind of environmental restructuring is necessary for the full functioning of each? And is there a primitive organizational sense whereby the digital “differences” in electronic pulses down a length of wire (or, in the biological case, an axon), and the sequential differences in base pairs affixed to the phosphate backbone of a DNA molecule really do in-form the immediate next moment of consequential change in a living system? How does all this work? And how does all this work together? These are the questions that biosemiotics will wind up asking, *seeking not a reductionist anthropomorphism of “all things in nature as human” but just the opposite: a principled evolutionary and biological understanding of how all*

things in human (and in animal life) are natural – including “knowing”, including “meaning”, including “thought” and because of these last three, including “signs”.

In addition, let us also quote the following:

But if biosemiotics has any one single most constructive message to give the mainstream scientific community, surely it is precisely this: a semiotic process is not a ghostly, mental, human thought process. Rather, it is, in the first instance, nothing more nor less mysterious than that natural interface by which an organism actively negotiates the present demands of its internal biological organization with the present demands of the organization of its external surround. And the fact that this is done incessantly – by all organisms, and by us – should not blind us to the significant fact that such moment-to-moment activity is always and perpetually an enacted accomplishment – and thus one that is going to have to be explained, if we are ever to understand the bio-logical side of living organisms’ material interactions. (Favareau 2010: 32)

It is therefore a refoundation of biology – if only through the redefinition of its object: the living being – by means of a way of thinking derived from another constituted science, semiotics. Here we find the Canguilhemian definition of scientific ideology, except that it is certainly not “*une croyance qui louche du côté d’une science déjà instituée, dont elle reconnaît le prestige et dont elle cherche à imiter le style*”²¹ (Canguilhem 1977: 44), but an already established science in search of a refoundation. It is, however, precisely this specificity that questions the epistemologist in biosemiotics: the encounter, within biology itself, of an *exorbitant* object, requiring new tools, and confronted with which biology comes to a “*méconnaissance des exigences méthodologiques et des possibilités opératoires de la science dans le secteur de l’expérience qu’elle cherche à investir*”²² (Canguilhem 1977: 39). This misunderstanding is all the easier since the science being solicited, semiotics, is confronted with the same difficulty in its own field, under the only slightly different aspect of a misunderstanding of its object. The tool borrowed by biosemiotics – the sign, the *semiosis* – appears, in fact, in the “recurrent light” of the Saussurean theorization of language, to have been elaborated without breaking with common knowledge. It is thus to the traditional definition of the sign that biosemioticians refer. For example, let us cite the Barbierian definition of meaning in “Biology with information and meaning”: “We can say, therefore, that *meaning is an object which*

²¹ “[...] a belief which *squints* toward an already instituted science, whose prestige it recognises and whose style it tries to imitate”.

²² “[...] misunderstanding of the methodological exigencies and of the operational possibilities of the science in the sector of experience which it seeks to invest”.

is related to another object by a code” (Barbieri 2003b: 249), to which must be added the definition of a system of signs given in “Is the cell a semiotic system?”, “Life is semiosis: The biosemiotic view of nature” and “On the origin of language: A bridge between biolinguistics and biosemiotics”: “a semiotic system is a system made of two independent worlds that are connected by the conventional rules of a code” (Barbieri 2007: 181/2008: 34/2010: 207), or the definition of a sign given by Favareau at the beginning of the introduction to his *Essential Readings in Biosemiotics: Anthology and Commentary*: “A sign is something that stands for something other than itself” (Favareau 2010: 2). Nor does the Peircean theory referred to by biosemioticians break with the traditional definition of the sign. Indeed, the framework is that of communication, as this definition of the sign shows, for example:

A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the ground of the *representamen*. (Peirce 1974[1931]: §228)

The Peircean sign is triadic, insofar as it is less sign than semiosis, i.e. acknowledgement, interpretation, operativity of the sign, and as such it remains an elaboration of the traditional definition of the sign: the linking of a sign and its object, albeit in the very particular Peircean sense of indication, as opposed to expression, in which the Peircean conception of meaning as distinct from the object as well as from the interpreter and the ground is inscribed. The icon/index/symbol tripartition is the primary manifestation of this problematic of the relationship between sign and object.

The continuity established by (bio)semiotics is therefore imaginary, because it is purely empirical. As we have seen, the Saussurean theorization of language, on the contrary, implies a double discontinuity, the two sides of which are correlative: in the field of semiotics, in the traditional sense, and in the history of the living beings. An interesting elaboration in this respect is that of Barbieri, whom Favareau describes as a “mechanist” (Notes 5 and 18). As we have seen above, unlike Thomas Sebeok and the schools of Copenhagen and Tartu, Marcello Barbieri refuses the coextensivity of *semiosis* and interpretation. He thus distinguishes three types of *semiosis*: manufacturing, associative, and interpretative. In “On the origin of language: A bridge between biolinguistics and biosemiotics”, this is only a question of organic codes and two types of interpretative semiosis, which follow one another in the history of living beings:

[...] semiosis appeared on Earth in the form of organic codes and later evolved into two types of interpretive semiosis: first the iconic and indexical semiosis of animals and then the cultural semiosis of our species. (Barbieri 2010: 221)

Marcello Barbieri recognizes the fundamental character of language, and this recognition seems to bring us closer to the Saussurean subordination²³ of semiology to linguistics:

The idea that man is different from animals is present in all cultures and is generally expressed by saying that only man has “higher” faculties like consciousness, free will, morality and the creative power to produce art, religion, science, and poetry (together with torture, mass murder, and environmental disasters). Today we have a shorter explanation for all that. All we need to say is that only man has “language”. The rest is just a consequence of that one faculty, so it is the origin of language that we need to understand if we want to find out what made us human. (Barbieri 2010: 210)

However, as the establishment of a typology of *semiosis* shows, the problematics remains continuist. In place of “vitalist” interpretation (in the sense of interpretative *semiosis*), it certainly substitutes the “mechanism” of a generation of new systems integrated by a set of organic codes, in whose production and conservation development of life consists, but this mechanism recovers, by biologizing it, the constitutive discontinuity of language. In the article quoted, Barbieri indeed proposes an original theory of the origin of language, in terms of *cerebra bifida*. The singularity of the human species is a fetal development (in particular cerebral) in two stages, intra-uterine and extra-uterine:

A modification of the epigenetic conditions of embryonic development is clearly an extremely powerful tool of change, and may well be the key to human evolution. The gradual extension of our foetal period together with the constraint of the birth canal have split the foetal development of our brain into two distinct processes, one within and one without the uterus, whereas in all other mammals it has remained a single process that takes place entirely within the uterus. This splitting of the foetal development of our brain into two distinct processes is a condition that can be referred to as *cerebra bifida*, in some ways analogous to *cardia bifida*, except that in the case of the heart the two organs arise from a separation in space whereas in *cerebra bifida* the two developments are produced by a separation in time. (Barbieri 2010: 217)

²³ If not established by Saussure, at least logically implied by his theorization of language.

The brain thus develops successively under the influence of two types of codes: organic and communitarian ones. First of all, we read:

The brain wiring that occurs in the last phase of foetal development provides the neurological basis for the mental models that the organism is going to use throughout its life. If that phase occurs in the highly stable and reproducible environment of the uterus, the operations of brain wiring follow a pre-established sequence of steps and generate a modelling system that has been highly conserved in evolution. In our species, however, the last phases of foetal development have been progressively displaced outside the uterus, in a radically different environment, and that created the opportunity for a radically new experiment in brain wiring. That was the precondition for the evolution of a uniquely human modelling system, but let us not forget that a precondition for language was not yet language. It was only a potential, a starting point. (Barbieri 2010: 215)

The sufficient condition for extra-uterine development is the interaction with one's surroundings, the observation of which gives rise to the notion of community code:

The wiring of the nervous system, in short, is achieved by the rules of a code, and the results obtained from wolf children and creole languages suggest that this may well be true for the wiring of our cognitive system, except that the rescuing role is exercised not by growth factors but by human interactions. In the case of language, in other words, the brain wiring rules are provided not by *internal* but by *external* factors, and this may well be the crucial difference that exists between our two modelling systems.

The genes of language are probably the same genes of the modelling system that we have inherited from our animal ancestors, and their expression is again controlled by the rules of a code, but the codemaker of language is not the single individual brain. It is a community of interacting brains that together generate the rules of a new brain-wiring code. (Barbieri 2010: 218–219)

However, this development can be explained, like the previous ones, in the mechanistic way indicated above. The general model is the following:

If we now look at the history of life from the organic codes' point of view, we realize that the same pattern is appearing all over again. Any new organic code brings a genuine novelty into existence, but the origin of a new integrated system always requires more than one code. [...] This initial set of codes, furthermore, has two outstanding properties (a) it is limited and (b) it is strictly conserved in all descendants. From this general pattern we obtain three main concepts:

- (1) The origin of a new integrated system in the history of life (the first cells, the first plants, the first animals, etc.) is produced by a limited set of new organic codes (the foundational set).

- (2) The further evolution of the system (eukaryotic cells or multicellular organisms) does not take place by a mere increase of components, but by a step-by-step addition of new organic codes.
- (3) The appearance of new organic codes is essential to the further evolution of the system, but equally essential is the conservation in all descendants of the foundational codes. (Barbieri 2010: 219–220)

Similarly, concerning the origin of language, Barbieri (2010: 220) makes the following hypothesis:

If we accept that it [the origin of language] was a biological event, it is not unreasonable to think that it had the same underlying pattern of the other events of macroevolution. This gives us the code model on the origin of language, a model that consists of three points.

- (1) The origin of language was due to a small set of new codes (the foundational event).
- (2) The evolution of language was due to the appearance of other codes at various stages of development.
- (3) The foundational set of codes has been strongly conserved and remains at the heart of the language faculty in all human beings.

The subtitle of Barbieri's article clearly states what is at stake in such developments, which is explained in the introduction: the establishment of a bridge between biolinguistics and biosemiotics:

Biosemiotics and Biolinguistics have been built in this way on different foundational principles and have become two increasingly different research programs. At the same time, they both advocate a scientific study of language (Augustyn 2009) and should be able therefore to reach similar conclusions. The purpose of this paper is precisely to show that such a convergence is possible. As we will see, the discovery of many organic codes in the living world provides the crucial data and ideas that were missing in both Biolinguistics and Biosemiotics, and leads to a unified framework where something is accepted and something else is rejected in both disciplines. (Barbieri 2010: 202–203)

In fact, we have here, through this mechanicism, a gateway to biolinguistics. The least that can be said is that this hypothesis is purely empirical, in that it *describes*, but does not explain nor define anything. More precisely, it addresses only one aspect of the problem: that of the effect of language on the brain, but considering it, conversely, as the production of language by the brain. Language is not defined otherwise than as the interaction of the child with the mother, and of children with

each other;²⁴ moreover, the origin, the nature and the stakes of these interactions remain unaddressed. It is important to take the measure of the circularity of this elaboration: language, whose existence is merely noted, is considered as a product of the brain, a product nevertheless determined from the outside. It is useful to compare this elaboration, in which the semiotic serves to reduce the linguistic to the biological, with the Saussurean elaboration of Alain Manier, who, taking note of the prematurity of the infant, distinguishes between language “essence” and speaking “being”:

Celui dont on dit qu'il "est venu au monde" n'est pas encore venu au social, à la relation langagièrement exprimée à l'autre. Néanmoins, être langagier – c'est-à-dire dont l'essence même recèle la dimension de la représentation et de l'expression langagières – chacun l'est, et depuis l'instant de sa conception. Par définition: car la conception n'est que ce moment précis de transmission de vie où, dans des conditions réglées, se répètent en une combinatoire différenciante les caractères constitutifs d'une espèce.

Françoise Dolto se plaisait à l'énoncer d'une formule volontairement provocatrice: "ce sont les enfants qui choisissent leurs parents", pour dire la contemporanéité en chaque humain de l'être et du désir. Ainsi lui est assigné, si tout va, le destin d'être parlant: seul, de toute l'animalité, il sera un être parlant pour être toujours-déjà un être langagier.

Mais l'être langagier qu'il est d'emblée a encore en tant que tel un devenir à accomplir, sous l'effet d'une prématurité particulièrement manifeste: il lui reste, pour ainsi dire, à se socialiser d'être langagier en être parlant. Car parler ce n'est pas phoner. C'est faire un usage social, c'est-à-dire socialement codé, du langage.

Bref, langagier et parlant, contrairement à ce qu'une approche inattentive laisse souvent croire implicitement, ne sont pas synonymes ni même nécessairement complémentaires. Le premier désigne un caractère essentiel propre à une espèce; le second renvoie à l'effet du fonctionnement (bon, mauvais, carent) de ce caractère, à sa mise en œuvre.

Autant il est patent qu'un état humain pré-langagier est un pur non-sens, autant tout humain commence sa vie parmi les autres, et ce pour une durée pouvant varier de six à dix-huit mois environ après la naissance, comme pré-parlant, ou étymologiquement: non-parlant (en-fant).

À ce stade, son essence (langagière) et son être (parlant) ne coïncident donc pas encore. Seule l'essence se déploie en sa plénitude; l'être est celui d'un prématuré. (Manier 1995: 35–36)

The one who is said to have “come into the world” has not yet come to the social, to the linguistically expressed relation to the other. Nevertheless, everyone is, and has been since the moment of conception, a being capable of language – that is to

²⁴ “We have learned in this way that the development of language crucially depends on interactions that take place first between child and mother and then between child and other children” (Barbieri 2010: 218; see also Barbieri 2010: 221).

say, one whose very essence contains the dimension of language representation and expression. By definition: because conception is only that precise moment of life transmission when, under regulated conditions, the constituent characters of a species are repeated in a differentiating combinatory.

Françoise Dolto liked to put it in a deliberately provocative way: “it is the children who choose their parents”, to express the contemporaneity of being and desire in every human being. Thus, if all goes well, the destiny of a speaking being is assigned to him: alone, of all animality, he will be a speaking being for being always-already a being capable of language.

But the linguistic being that it is from the start still has as such a becoming to accomplish, under the effect of a particularly manifest prematurity: it remains, so to speak, to socialize itself from a being capable of language into a speaking being. For to speak is not to “phone”. It is to make a social, i.e. socially coded, use of language.

In short, capable of language and speaking, contrary to what an inattentive approach often implicitly suggests, are not synonymous or even necessarily complementary. The former designates an essential character specific to a species; the latter refers to the effect of the functioning (good, bad, carent) of this character, to its implementation.

It is certainly obvious that a pre-capable of language human state is pure nonsense, but every human begins his life among others, and this for a period that can vary from about six to eighteen months after birth, as a pre-speaking, or etymologically: non-speaking (in-fans).

At this stage, its essence (capable of language) and its being (speaking) do not yet coincide. Only the essence unfolds in its fullness; the being is that of a premature baby.

He then takes up the Saussurean definition of language (*la langue*) to define language (*langage*) as a socially coded articulation between thought and speech, an articulation whose advent constitutes the whole issue of the first months of a child’s life (see Manier 1995 as well as 2003). It remains, of course, to articulate this psychoanalytical definition of language with this language essence, which is for its part biologically determined and, in particular, the question of the origin of language remains pending. However, this articulation can therefore be neither a suppression (biolinguistic, scientist) nor a fusion (biosemiotic). On the contrary, it becomes possible to inscribe language in a history, but without reducing it to its biological substratum, nor dissolving it into a semiotics, necessarily elaborated, as such, without breaking with common knowledge. Barbieri’s elaboration clearly shows that these two reductions – of language to brain and of language to life – are two sides of the same coin,²⁵ and that this reversibility is linked to a two-headed

²⁵ The development of neurosemiotics is particularly noteworthy in this respect (see Favareau 2002; 2010: 55; Roepstorff 2004). See too for example Swan 2011, which shows that “biosemiotics

empiricism: what responds to biologizing scientism is the evidence of the common definition of language as an instrument of communication and as a system of signs, in the sense of an *aliquid quod stat pro aliquo*. Terrence Deacon's elaboration (see Deacon 1997), which, on the contrary, seeks to refute the inneist thesis of Chomsky's biolinguistics, shows this – then paradoxically – in a different way. Like Barbieri, Deacon opposes two types of communication: iconic-indexical and symbolic, and recognizes the fundamental character, if not of language, at least of symbolism. If Manier – from whom I borrowed the name above – proposes to substitute the designation *homo sapiens loquens* for *homo sapiens sapiens*, he speaks for his part of *homo symbolicus*. His problematics is nevertheless profoundly different, insofar as it is just as continuous and – at least linguistically speaking – empirical as Barbieri's: it is a question, within the framework of the definition of language as an instrument of communication, of determining the adaptive advantage procured by symbolic communication, compensating for the cognitive cost of learning it. In other words, language, otherwise recognized as external to the brain – at the price, significantly, of a return to the organicist metaphor definitively rendered obsolete by Saussure – continues to be conceived as a product of the latter: it is an adaptive solution, whose brain must allow learning, even if its evolution must then be constrained by this product. The necessary condition thus surreptitiously becomes a sufficient condition, closing the possibility of discontinuist reflection, i.e. which would conceive the possibility of a definition of language by the very discontinuity it introduces, instead of using it as the support for an explanation of such a discontinuity, hence necessarily based on the definition of common knowledge. This is a measure of the immensity of the Saussurean contribution to linguistics and, more broadly, to the sciences of language as a human phenomenon: an ontogenetic reflection aimed at defining the nature of language instead of speculation on its origin – its genesis – based on the definition of common knowledge. In the “recurrent light” of this contribution, it is clear that continuism and empiricism – the epistemological obstacle of the idiom, i.e. of the objectality of language, which supports the definition of common knowledge by its obviousness – go hand in hand. It is then that it is important to take the measure of this other epistemological obstacle constituted by the distinction between “hard sciences” and “human sciences”: positing two types of object, while implicitly postulating one type of scientificity, it prevents us from putting ourselves “in the school of scientists”, and as such condemns its overcoming to be nothing more than a scientific overlay, either by suppression (biologism) or by imitation

can provide a comprehensive theoretical framework necessitated by the biolinguistic thesis that language emerges from human biology” (Swan 2011: 367).

(scientific ideology). The originality of biosemiotics is to be an imitation recovering a suppression. In this respect, this other reading of Uexküll that constitutes Canguilhemian vitalism retains a decisive actuality. In particular, the conclusion of “*Le vivant et son milieu*” (1946–1947) can be cited:

Un centre ne se résout pas dans son environnement. Un vivant ne se réduit pas à un carrefour d'influences. D'où l'insuffisance de toute biologie qui, par soumission complète à l'esprit des sciences physico-chimiques, voudrait éliminer de son domaine toute considération de sens. Un sens, du point de vue biologique et psychologique, c'est une appréciation de valeurs en rapport avec un besoin. Et un besoin, c'est pour qui l'éprouve et le vit un système de référence irréductible et par là absolu. (Canguilhem 2006[1965]: 197)

A centre cannot be resolved in its environment. A living being cannot be reduced to a crossroads of influences. Hence the inadequacy of any biology which, by complete submission to the spirit of the physico-chemical sciences, would like to eliminate from its domain any consideration of meaning. From the biological and psychological point of view, a meaning is an appreciation of values in relation to a need. And a need, for the one who experiences it and lives it, is an irreducible and therefore absolute reference system.

Indeed, the interpreter of the sign is replaced by the living being as the polarizer.²⁶ Now, while the former implies a continuity masked by a typology, the latter allows for the possibility of modalities and discontinuities, including that of language Denis Forest (2005: 4–6) claims about “*Le cerveau et la pensée*” (1980):

Le contraste demeure frappant entre la patiente reconstitution de la formation du concept de réflexe opérée par Canguilhem, et la manière dont l'article tardif

²⁶ This 1941 note quoted by Pierre Macherey is thus a useful counterpart to the naturalization of the sign of biosemiotics: “*Si nous admettons, en accord du reste avec la suggestion étymologique, que juger c'est discriminer et évaluer, pourquoi refuserions-nous le jugement même à une amibe, à un végétal? Partout où il y a vie [...] il y a discernement et choix et donc il y a jugement. Parce que la conscience relative dont il jouit permet à l'homme de construire une théorie du jugement, cela n'entraîne pas que la puissance de juger commence à lui et soit refusée aux vivants autres que lui*”. (Canguilhem, quoted by Macherey 2016: 8; “If we admit, in accordance incidentally with the etymological suggestion, that to judge is to discriminate and evaluate, why would we deny judgment even to an amoeba, to a plant? Wherever there is life [...] there is discernment and choice and therefore there is judgment. Because the relative consciousness he possesses allows man to construct a theory of judgement, this does not mean that the power to judge begins with him and is denied to living beings other than himself.”) Macherey, Pierre 2016. Canguilhem et l'idée de milieu. In: *La philosophie au sens large* was accessed at <https://philolarge.hypotheses.org/1737> on 26 June 2019.

“Le cerveau et la pensée” (1980) exprime les plus fortes réserves à l’égard de toute assimilation du cerveau et de la pensée, de toute prétention explicative de la connaissance du premier vis-à-vis de la seconde. Ce n’est pas le cerveau de Descartes, mais Descartes, affirme Canguilhem, qui se plaît en Hollande. [...]

[...] On est avec Canguilhem, en présence d’une entreprise qui valorise l’histoire de la connaissance du système nerveux central, mais dans le même temps, minore l’importance philosophique de la connaissance du cerveau lui-même, et suspecte l’usage irréfléchi d’une telle connaissance, par assimilation hâtive de la pensée comme activité ou travail à la structure ou à la fonction d’une chose.

[...] Plutôt qu’une “résistance” du mouvement volontaire à “l’entreprise du physiologiste”, c’est une réticence à l’égard de cette entreprise elle-même (ou de cette entreprise, en tant que dirigée vers le domaine de la volonté) qu’il faut bien reconnaître de la part de Canguilhem. Or, on peut aujourd’hui, je crois, être philosophiquement insatisfait du partage qui en résulte entre une physiologie mécaniste et une revendication (osera-t-on dire: spiritualiste?) d’irréductibilité de l’individu pensant à l’investigation des sciences, et pas uniquement, d’ailleurs, de celles de la nature.

The contrast between Canguilhem’s patient reconstruction of the formation of the concept of reflex and the way in which the late article “The brain and thought” (1980) expresses the strongest reservations about any assimilation of brain and thought, any explanatory claim of the knowledge of the former to the latter remains striking. It is not Descartes’ brain, but Descartes, Canguilhem asserts, who enjoys Holland. [...]

[...] With Canguilhem, we are in the presence of an enterprise that values the history of knowledge of the central nervous system, but at the same time, undermines the philosophical importance of knowledge of the brain itself, and suspects the unthinking use of such knowledge, by hastily assimilating thought as an activity or work to the structure or function of a thing.

[...] Rather than a “resistance” of voluntary movement to the “physiologist’s enterprise”, it is a reticence towards this enterprise itself (or towards this enterprise, as directed towards the domain of the will) that we must recognize on the part of Canguilhem. Now, we can today, I believe, be philosophically dissatisfied with the division that results between a mechanistic physiology and a claim (dare we say: spiritualist?) of irreducibility of the thinking individual to the investigation of the sciences, and not only, by the way, of those of nature.

However, this text can also be read as an affirmation of the irreducibility of language, to be constructed *in its heterogeneity*, i.e. avoiding any continuism. It is therefore worthy of mention, at a time when “neuroscpticism”²⁷ does indeed seem prudent. And I will conclude this article, which, as I indicated in the introduction, has no other aim than to contribute negatively – polemically – to

²⁷ This is the title of another book by Denis Forest (Forest 2015[2014]).

such a construction of language in its heterogeneity, by quoting this proposition from “*Le cerveau et la pensée*”: “*Le je n’est pas avec le monde en relation de survol, mais en relation de surveillance*” (Canguilhem 1993: 29), which can be read as a definition of the philosopher’s specific task (see Canguilhem 1993: 29–30). Indeed, it seems that the philosopher has today lost his place in the language sciences – to the detriment of the latter, so necessary is this surveillance function.

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²⁸ The first edition of the *Cours de linguistique générale* dates back to 1916. 1972 is the date of the first edition that is accompanied by the critical apparatus by Tullio de Mauro.

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²⁹ Toutain 2012 can be accessed at http://www.e-sorbonne.fr/sites/www.e-sorbonne.fr/files/theses/TOUTAIN_Anne-Gaëlle_2012_Montrer-au-linguiste-ce-qu'il-fait.pdf or <http://tel.archives-ouvertes.fr/tel-00788676>.

Знак, функция и жизнь: эпистемологические размышления о биосемиотике

В статье предлагается эпистемологический анализ проблематики биосемиотики, основанный на теориях Башляра и Соссюра. Сначала мы характеризуем эту дисциплину в целом; ее противопоставление биолингвистике позволяет констатировать, что биосемиотика основана на традиционном определении знака. Затем в статье анализируется соссюровский разрыв с этим традиционным определением, а также теоретические размышления, лежащие в основе соссюровского концепта языка – *la langue*. Биосемиотика предстает в этом свете как научная идеология в понимании Жоржа Кангилема. Она уподобляется структурализму – другой научной идеологии, делавшей акцент на понятии структуры, – однако при этом сосредоточена на отношениях между звуком и смыслом. Общность проблематики биосемиотики с проблематикой биолингвистики и отличие биосемиотики от биолингвистики проявляются одновременно: и биолингвистика, и биосемиотика игнорируют гетерогенность и прерывность, присущие языку, однако редукционизм биосемиотики принимает форму «растворения» [*dissolution*], в то время как в основе биолингвистики лежит органицизм.

Märk, funktsioon ja elu: epistemoloogilisel biosemiootikast mõeldes

Artikkel keskendub biosemiootika problemaatika analüüsile nii Bachelard'ist kui ka Saussure'ist lähtuvalt. Seda distsipliini iseloomustatakse esmalt selle üldjoonte põhjal ning vastandatuna biolingvistikale – iseloomustus, mis võimaldab meil näha selle tuginemist traditsioonilisele märgimõistele. Seejärel selgitatakse Saussure'i lahkulöömist sellest traditsioonilisest definitsioonist ning ühtlasi ka Saussure'i poolt kasutusele võetud 'keelee' (*la langue*) mõiste teoretiseerimist, seletades antud: idioome. Selles "korduvas valguses" osutub biosemiootika teaduslikuks ideoloogiaks Georges Canguilhemi tähenduses. See on teise teadusliku ideoloogia, struktuuri mõistet rõhutanud strukturalismi vaste, ent sedapuhku on kirjelduse keskmes kõla ja tähenduse seos. Selle ühine problemaatika biolingvistikaga ning samas ainulaadsus biolingvistikaga võrreldes tulevad ilmseks üheaegselt: kui nii biolingvistika kui ka biosemiootika mõlemad eiravad keelele omast heterogeensust ja katkendlikkust, võtab biosemiootika reduktsionism mitte biolingvistikale aluseks oleva organitsismi, vaid lagunemise kuju.