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Cybersemiotics and Human Modelling

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Abstract: Cybersemiotics, in forging a new philosophy of science, addresses the failure of all disciplines to recognize and adequately account for qualia and motivation, interrogates the status of 'knowing' contra the computational information-processing paradigm, and explores the role of the observer in knowing. The present article discusses these key features of cybersemiotics and, in particular, their consequences for biosemiotics (to which cybersemiotics is a contributor). It argues that the constructivist basis of 'languaging' in the cybersemiotic project presents a potential impediment. It suggests that although 'language' is clearly in question in conceptualizing 'knowing' and 'observing', the main issue for cybersemiotics has to do with the more general process of 'modelling' that features in biosemiotics. Whilst the future of research in the sphere of biosemiotics will be enhanced by a greater understanding of 'observership', the article argues that aspects of the relationship of constructivism and realism will need to be made clear, and that the tools for this are available closer to cybersemiotics' home in general semiotics.

Keywords: qualia; motivation; observer; languaging; Maturana; modeling; biosemiotics; Sebeok; object; language; knowing; constructivism; realism

1. Introduction

Cybersemiotics is a truly transdisciplinary project. It is not so much that it criss-crosses the sciences and the humanities and invokes knowledge from both (although it does do that), but rather it is transdisciplinary because it explores, through expertise in philosophy of science, concepts which have a purchase right across nature and culture. The two concepts at cybersemiotics' forefront, I would argue, are 'qualia' and 'languaging', both of which are central to debates about what it is to be a human animal and both of which, within the kind of transdisciplinary perspective that cybersemiotics

exemplifies, have been the object of undue neglect. In what follows, I will attempt to demonstrate some of the implications arising out of cybersemiotics' focus on qualia and 'languaging' while also suggesting that the latter, especially, might yet be re-figured in terms of modelling. Although 'languaging' does serve the purpose of emphasizing the manifold nature of observation, which is the very project of second-order cybernetics, it also purports to address bigger questions about the nature of human being and knowing. The present article suggests that the issue in this respect is a matter of how humans model.

The transdisciplinarity of cybersemiotics that is directed to the development of a new understanding of human knowing (and being) necessitates the acknowledgment of blind spots in, especially, the information-processing paradigm which has been promulgated in cognitive science and elsewhere in recent years. Without going directly to Brier, possibly the best summary of cybersemiotics is offered by Thomsen [1] in this current special issue. There, Thomsen shows how cybersemiotics theorizes human observation and dialogue with reference to the 'four worlds' in the cybersemiotic star. In the present article, the focus is on cybersemiotics' concern with observing, touching on the issues of the components of communication, but mainly as an important part of the project of the epistemological break constituted by biosemiotics and, by extension, the theorization of the human Umwelt in general. As a corollary, it is necessary to also add some comment towards the end on the specifics of 'knowing'.

2. Qualia and Motivation

The questions of both qualia and the impetus for specific semioses have been ubiquitous and yet unanswered or repressed in a range of disciplines from neurobiology to psychology to philosophy. The questions add up to a good indication of the limits of knowledge in traditional disciplines, and in respect of some of the simplest natural functions about which so little is known. On more than one occasion I have seen Brier, the father of cybersemiotics, give papers in which he states, while lifting an arm, that "we do not even know what it is that allows us to do this", demonstrating at a stroke the relative poverty of biology, cognitive science, psychology and sociology. His point is that 'we' *do* know that there are feelings and that there are motivations and we *do* know that these *do not* come from nowhere and nothing, but we do not know from where or how they can make our body move in accordance with our 'will'. These are huge questions; nevertheless, they are related to the agenda of cognitive science in only an oblique way, because of the continuing influence in numerous areas of the information-processing paradigm. Questions regarding the make-up of affect in relation to intellectual and bodily experience have been asked more pressingly in other areas — for example, neurology [2,3] and, germane to the present discussion, semiotics [4].

The experiential and phenomenal properties of perceptual and/or bodily experience — feelings, desires and thoughts — are, as far as Peirce was concerned, signs, but, more specifically, qualia — qualisigns (to be exact), a type of sign which requires a further sign to become manifest. They are the prerequisite for all cognition and communication. Certainly, Brier ([5] p. 110) presents a forceful argument for their role in exposing the insipid flavour of uni-disciplinary reductionism:

> *Originally educated as a biologist, I have long been skeptical about research programs based on the belief that mechanicism could provide an adequate framework for the understanding of living systems. Furthermore, from a psychological and semiotic point of*

view it does not seem likely that theoretical understandings of the inner world of sensations, feelings, signification, and volition of living systems can emerge from mechanistic or functionalistic algorithmic thinking. A broader framework — both trans-disciplinary and non-reductionist — is therefore necessary.

In cybersemiotics, "The ability to have sense experiences and to be able to distinguish between qualitatively different ones (qualia) — sweet and sour, hot and cold, red and green — is basic to knowledge, understanding, communication, and intelligent reasoning" ([5] p. 38). These 'basic' sense experiences are of a piece, or continuous, with the 'higher' mental processes. This is the first point of cybersemiotics' insistence on the investigation of qualia.

The second point has to do with the role of qualia in agency. Cybernetically-orientated thinkers, from Bertalanffy to Bateson, and even Luhmann with his focus on socio-communication, have not been able to theorize, or often even countenance, the agency of subjects. Whence does the impetus for agency — its motivation —arise? Despite a famous debate about arbitrariness and motivation running through the work of Benveniste [6], Martinet [7] and Barthes [8] in semiologically-inflected linguistics, the theme has sometimes been neglected in the mainstream of semiotics. The matter is foundational in sociosemiotics [9–11], since no sign can escape from the *uses* to which it has been put by a collectivity, historically and socially. Similarly, in cybersemiotics' sign theory, the impetus for agency is a central issue. The matter bears on the understanding of 'languaging', too, as will be seen. Specifically, cybersemiotics extends 'motivation' with reference to ethology. Motivation ([5] p. 156):

can be said to occupy the same position within ethology as the concept of life in biology, or that of the law of gravity and the attraction of masses in Newton's classical mechanics. In other words, it is an "occult" basic concept that cannot be explained within the paradigm, but that cannot be ignored either.

Citing (and translating) Madsen [12], Brier ([5] p. 157) notes that psychoanalysis and American learning theory attempted to grasp motivation through the concept of 'trieb' or 'drive'. Yet, even these are too reductionist in their bearing to be able to encapsulate the notion at hand. The problem is "immense complexity!" The complexity of neuro-physiological states, Brier notes, makes it necessary to always classify them with reference to some kind of broad *interest*, or at least some point of view ([5] p. 157).

The elusive nature of motivation places it alongside qualia with reference to consciousness. Indeed, "Motivation seems to be an intention just below the level of consciousness" ([5] p. 345), an occurrence which prevented von Uexküll building it into his theoretical framework, but which corresponds to a range of investigations and theories about cognitive functions, from Freud's positing of the 'pre-conscious' to "the well known experiments showing that decisions of actions seem to be made on a level below consciousness, and a few seconds before we become aware of them" ([5] p. 428). In more recent work [13], cybersemiotics has made use of the work of Damasio, a potentially important thinker for both semiotics and cybernetics. *Descartes' Error*, for example, is dedicated *inter alia* to exploring how "The organism actively modifies itself so that ... interfacing [with the environment] can take place as well as possible" ([2] p. 225). This perspective attempts to fill the "explanatory gap" ([3] p. 9) that exists in neurobiology in relation to qualia. It arguably fits in nicely with cybersemiotics.

Cybersemiotics, of course, does not definitely resolve the problem of feeling and motivation, nor does it imagine it could do so. However, through Peircean phaneroscopy,cybersemiotics it is one of few frameworks which factor first-person experience as central. The concept of qualia figured in cybersemiotics offers a basis for a theory of agency, and hence of subjectivity. Yet, in relation to the question of subjectivitie*s* or 'intersubjectivity', too, cybersemiotics has a defined project. The basis of this is the idea of 'languaging', although it will be argued that cybersemiotics could reach beyond some constructivist restrictions to a position more befitting cybersemiotics' own Peircean underpinning.

3. Language

Language' in cybersemiotics is re-figured as a process, 'languaging', derived from the work of Maturana. Brier ([5] p. 27) is wary that Maturana leaves qualia and emotions unexplained. Nevertheless, the utility of Maturana's concept for the understanding of the observer, dialogue and 'language in society' is understandably welcome in cybersemiotics. Since qualia are signs, and signs are commonly thought to have or 'convey' meaning; and since language is thought to be the foundation stone of meaning in human sociality, there is an opportunity for cybersemiotics to forge links through semiotic thinking. "Meanings", writes Brier ([5] p. 87, emphasis in the original),

> *are the result of a coupling process based on joint experiences. This is an important foundation for all languages and all semiosis. Words do not carry meaning; rather, meanings are perceived on the basis of the* perceiver's *background experience. Percepts and words are not signals, but a perturbation whose effect depends on system cohesion.*

Thus cybernetics proceeds on a theory of language as an 'intersubjective' process based on structural coupling — humans (language users in all their sociality) and their environment (the social world of communication). Most importantly, this structural coupling of 'languaging' is how humans 'know' and perpetuate their knowing:

> *It is by languaging that the act of knowing, in the behavioural coordination which is language, brings forth a world. We work out our lives in a mutual linguistic coupling, not because language permits us to reveal ourselves but because we are constituted in language in a continuous becoming that we bring forth with others ([13] pp. 234-5).*

Maturana and Varela add that the uniqueness of being human lies exclusively in a social structural coupling that occurs through 'languaging' ([13] p. 246).

Maturana's 'languaging' seems ideal for cybersemiotics. It re-casts language as a verb rather than a noun: 'to language' entails having the capacity to use verbal figures in structural coupling plus the *actual use* of them in the very act of coupling. Crucially, Maturana ([15] p. 30) also sees 'languaging' as *consensual*:

> *Language as a domain of recursive consensual coordinations of actions is a domain of existence, and, as such, a cognitive domain defined by the recursion of consensual distinctions in a domain of consensual distinctions. Furthermore, human beings as living systems operating in language constitute observing, and become observers, by bringing forth objects as primary consensual coordinations of actions distinguished through*

> *secondary consensual coordinations of actions in a process that obscures the actions that they coordinate. Human beings, therefore, exist in the domain of objects that they bring forth through languaging. At the same time, human beings by existing as observers in the domain of objects brought forth through languaging, exist in a domain that allows them to explain the happening of their living in language through reference to their operation in a domain of dynamic reciprocal structural coupling.*

As a biological phenomenon, 'languaging' is seen to arise as part of the co-existence of living systems. In his later writings Maturana sees 'languaging' in the "the flow of our living together in recursive consensual coordinations of doings" ([16] p. 19). Thus, "a word can have as many different meanings as there may be different flows of recursive coordinations of doings in which they participate" ([16] p. 20). This latter perspective does not constitute the mainstream but is certainly not unusual in linguistics and communication theory. Integrationism, for example, insists that words are not to be considered the domain of a reified 'language', but as dynamic, changing factors different each time in communication (although it prosecutes this position without the functionalistic overtones of Maturana; see, for example, [17]. The general point is not unrelated to von Foerster's repeated assertion that the 'von Foerster' that exists at any one moment is not to be considered the 'von Foerster' of a few moments later (see, for example, [18]), which would rather make him a dangerous person with whom to sign a contract. What matters about this change in circumstances for Maturana and cybersemiotics is the way that 'languaging' constitutes observers:

> *An observer is, in general, any being operating in language. We are already observers by being in language when we begin as observers to reflect upon language and the condition of being observers. In other words, whatever takes place in the praxis of living of the observer takes place as distinctions in language through languaging, and this is all that he or she can do as such ([15] p. 30).*

'Languaging' is the "praxis of living of the observer", and also generates the "praxis of living of the observer" ([15] p. 29).

All this seems useful: it offers, on the one hand, an understanding of what is taken to be the defining characteristic of human being and knowing — 'language' — without reducing it to mere tropes or figures of speech. On the other hand, it offers a version of 'language' that is more active, acknowledging its grounding in sociality rather than, say, plain neurology. It promises to provide the basis for an account of the *human* observer and, ultimately, the *human* subject, although it offers nothing to the zoosemiotic and phytosemiotic realms. As such, it appears to bring together language's role in cognition as well as its role in dialogue and human interaction. Yet, the most far-reaching implications of 'languaging', undoubtedly so for the cybersemiotic project, are that it moves towards conclusions on the nature of humans' inhabiting of the world at large. Contemporary semiotics utilizes a notion that, at first sight, seems to be consonant with 'languaging', that of *Umwelt*, from von Uexküll. The basis for the similarity lies in the idea that all species live in a 'world' that is constructed out of their own signs, the latter being the result of their own sign-making and receiving capacities. In cybersemiotics, this is further qualified by the use of the term 'signification sphere' to designate the realm within *Umwelten* where triadic signs come to fruition and are bound in the process of circulating

'meaning' (see [5] pp. 32-4, 398-402). Hence *Umwelten* also feature protosemiotic processes akin to 'information' or signs that are not in a fully-fledged triadic state. 'Language', however, presents a special case. For *Umwelt*, as in 'languaging', there is the idea of language as a cognitive capacity and language as constituting/constituted by the 'social' world of signs. Thus, when Maturana states that "Human existence is a cognitive existence and takes place through languaging" ([15] p. 40), there seems to be some compatibility between the two perspectives — Uexküll's and Maturana's — which feed into cybersemiotics. Yet, Maturana ([15] p. 40) adds:

> *cognition has no content and does not exist outside the effective actions that constitute it. This is why nothing exists outside the distinctions of the observer. That the physical domain of existence should be our limiting cognitive domain does not alter this. Nature, the world, society, science, religion, the physical space, atoms, molecules, trees..., indeed all things, are cognitive entities, explanations of the praxis or happening of living of the observer, and as such, as this very explanation, they only exist as a bubble of human actions floating on nothing. Everything is cognitive, and the bubble of human cognition changes in the continuous happening of the human recursive involvement in co-ontogenic and co-phylogenic drifts within the domains of existence that he or she brings forth in the praxis of living.*

Despite the attempt to account for the observer, there are clear problems in this statement, particularly for semiotics.

In 'languaging', Maturana is clearly advancing a constructivist position in which, as he states, "Everything is cognitive". Given that this is the case, the Kantian overtones in the notion of *Umwelt* become a positive advantage. Firstly, the concept of *Umwelt* carries with it the adjunct that beyond species' capacities of semiosis there is a world — the 'real world', in one sense — which cannot be reached. Within a species' *Umwelt* there are all manner of possibilities of 'illusion' — through misinterpretation of signs, through overlooking of signs and through signs not being 100% adequate representations of reality. Yet, as Sebeok repeatedly pointed out (see, for example, [34] p. 14), usually referring the point back to Francois Jacob, the testimony that an Umwelt is a fairly good guide to reality — a workably accurate *model* — is offered by the survival of the species within a given *Umwelt*. If an *Umwelt* offered an irredeemably faulty grasp of reality, then that species would not survive. In contrast to 'languaging', this is a realist epistemology more in tune with cybersemiotics than constructivism. Secondly, and also more in tune with cybersemiotics, is that a workable model derives not from 'cognition' understood in terms of conscious perception and knowing. Rather, an *Umwelt* rests precisely on a species' sensoria, undeniably bodily phenomena which entail that the *Umwelt* of the dog, partly derived from its acute ability to hear high-pitched sounds, differs qualitatively from that of the human whose hearing is focused on a lower pitch. What both dog and human *Umwelten* fail to apprehend poses a potential — albeit limited — threat to their survival; what dog and human share — for example, hunger, albeit in different physiological and cognitive configurations — stresses continuity in respect of life forms on planet earth. Each of these cases is pertinent to the realist bearing of cybersemiotics.

These points are developed in relation to modelling in the next section. Before this, however, some further issues with 'languaging' and its place in cybersemiotics need to be raised, particularly if

cybersemiotics is to provide biosemiotics, as well as cultural analysis, with a transdisciplinary theory of the observer. It is well known that Maturana was wary of the application of the concept of autopoiesis to socio-communication. Yet, the study of communication in socio-cultural formations is useful in the present context. Brier himself refers to a dominant branch of thinking about human interaction, "the linguistic or hermeneutic view", lamenting that in such constructionist thinking "All that is left is different forms and combinations of power and meaning games in a post-modern age" ([20] p. 35). Moreover, this is not a caricature, nor is Brier wrong. However, in thinking about some of the predicates of 'languaging', an awareness of those power relations is actually helpful. Particularly problematic in 'languaging' is its bearing towards the 'consensual', a dialogue where each participant is equal and charitably orientated to the other. This is clearly a functionalist vision. If it is compared with, say, the perspective of the Bakhtin School [9], it is clear that 'languaging', while offering the opportunity of accounting for the observer in mutable circumstances, fails to figure conflict, interest and the 'demand of the other' [21]. It is difficult to see how a theory of observation can progress without these. Cybersemiotics' idea of motivation provides the basis for such a theory; but it still needs development, and, inevitably, will only make progress when cognitive science and biosemiotics start to ask the right questions. What the 'demand of the other' actually reveals concerns an integral feature of 'languaging': structural coupling is useful for explaining systematic interaction and operational closure, but even in the work of Luhmann it deals too lightly with conflict and interest. Thomsen ([1] p. 395) makes a similar point in respect of communication and the definition of 'language' (italics in the original):

> *All kinds of communication require 'mutual structural couplings', or "contact", between two organisms connected via a medium of communication. With respect to language, this must imply that there is a structural coupling, within the 'social system', between two communicating linguistic cyborgs (or, 'natural language users' [12]). In the next section this will lead me to the claim that language as a semiotic resource is basically an individual's communicative competence – phylogenetically inherited as a blueprint, but ontogenetically acquired, learned, and developed due to cultural-communicative input (a token dialect). Only on a secondary, emergent level is it a community language, a common norm (a type dialect).*

Thomsen's explanation of 'language' as *communicative competence* is largely a traditional one; however, his points about linguistic cyborgs and the community language economically illustrate the problems with structural coupling when it is brought to bear on experience of communication.

The notions of 'community language' or 'structural coupling' or the dialogue which takes place in 'languaging' open up an interesting debate, and seem to offer an opportunity for cybersemiotics. The critique of the information-processing paradigm in respect of cognition creates a distance between cybersemiotics and those theories of language which might be based on neurology and physiology alone. At the same time, cybersemiotics eschews the equally reductionist formulations of the 'linguistic turn', the idea that everything (for humans) is constructed in discourse. Yet, in its embrace of 'languaging' it does seem that cybersemiotics at times comes perilously close to reproducing the 'linguistic turn' even while it attempts to repel it. Perhaps more so than in the case of Maturana's 'languaging', the problem lies with the fidelity to Wittgenstein's contentions about "language games".

In accounting for the sociality of 'language', Brier ([5] p. 405) writes

> *'Language games' arise within social contexts where individual minds coordinate their actions with fellow members of their culture. Some of these language games concern our conceptions of nature, as filtered through a common culture and language. But underneath that lies an emotional and instinctual biological sign game of what have become paralinguistic signs that originated in the evolution of the signification processes of living systems.*

Brier's attention to ethology, here and elsewhere, represents an attempt to take account of zoosemiosis, an attempt that Maturan does not evern make. Yet, the Wittgensteinian frame is unhelpful. The idea of 'language games' has been very popular in certain circles and, although this is not on its own cause for suspicion, I have argued elsewhere [22,23] and hinted above that inherent in the idea is an unrigorous formulation of 'language' as mere 'chatter'. By this is meant 'language' taken to consist of a series of tropes, figures of speech and vicissitudes of verbal communication. Such an approach to 'language' can be seen in middlebrow discussion in Sunday newspaper supplements and popular books on language (see, for example [24–26]). It is also evident in some linguistic specialisms, especially the focus on national languages rather than on the cognitive phenomenon of language. Often, this latter involves those who, knowingly or unknowingly, embrace the Sapir-Whorf hypothesis or linguistic relativism too readily (for example, [27–30]). In cybersemiotics, the supposed multifarious nature of language/sign games are the basis of the eschewal of cognitivism: "even more language games are actually in play in the IR [information retrieval] — process, as is already understood by the cognitive viewpoint and its multiple uses of the concept of 'about-ness'" ([5] p. 288). The problem is not so much that Brier is barking up the wrong tree when he argues about language as a product of human action and language as constituting human interaction; rather, it is the terminology — 'language' being the term utilized to discuss two simultaneous and connected functions but, nevertheless, veering too often towards 'chatter'. For example, Brier ([5] p. 408) adds,

> *We are not only linguistic beings that think, learn, communicate, and co-ordinate through language, but language also thinks with us, and behind our backs. Insofar as we speak language, we are also spoken by language, which makes it difficult for us to think 'behind' language. We must begin our search for knowledge by realizing that our mind is semiotic. It is built on — or from — semiotic processes even at the animal stage.*

The preceding passage does give the impression, despite the invocation of semiotics, that when "we are … spoken by language" it is a mechanism of 'chatter' that is in play — that is, verbal communication, especially on the local basis that has spawned national languages. The terminological and conceptual consequences of this are one thing; however, there are also consequences in relation to the question of disciplinarity close to cybersemiotics' heart, since it is precisely the "use of the word *language* in which it is pluralisable in English" ([31] p. 12) that is at the root of what Harris identifies as the 'language myth' and which he argues has perpetuated disciplinary specialisms. An important distinction has not been made, the distinction between language as a cognitive capacity and the verbal interaction which is one of that capacity's manifestations.

That there is a problem with the designation 'language' and some of the thinking in utilizing this term in cybersemiotics is indicated by the attempt to fit it into the broader ethological and biosemiotic frame. Thus, Brier moves from 'language' to 'sign':

> *Because animals do not have language with syntax and generative grammars, I call what they do sign games. I am extending Wittgenstein's life form concept into the animal kingdom by taking seriously his claim that forms of life are a part of our natural history. For instance, the structural coupling of mating creates the sign game of the mating game life form ([5] p. 257).*

and:

> *seen from ethology, second-order cybernetics, and biosemiotics, the basis for human life forms and language games is sign games in our natural history. These habits are what the ethologists call instincts. Instincts can be combined with individual learning in different proportions to conduct a communicative act, such as a bird song, and eventually open as 'sensitive periods' for the type of learning that occurs during human language acquisition ([5] p. 258).*

The shift from 'language' to 'sign' is a shift from 'human' to 'animal as a whole'. As Thomsen [1] diplomatically indicates, cybersemiotics currently pays insufficient attention to non-verbal communication. Indeed, arguably, it also features a verbal bias in its falling back on 'languaging' and 'language games' to theorize the observer, not to mention a potential impediment to theorizing the continuity of human and other animal worlds. The shift, here, then, is, strictly, from verbal to 'nonverbal and verbal'. This is significant because it is precisely this dual characteristic that defines humans according to Sebeok and, moreover, it does so through a rethinking of the concept of 'language' as modelling.

4. Cybersemiotics and Human Modeling

As a supporter of cybersemiotics, I do not seek to invalidate its basic tenets, nor would I wish cybersemiotics to be completely something else. However, I do think it is necessary to augment and develop the cybersemiotic perspective, in addition to the effort to maintain it. To this end, I have been suggesting that the concept of 'languaging', despite coming from 'cyber' strains of thought allied to systems theory, is not best suited to the synthesis that cybersemiotics enacts. Instead, I would propose that there is a perspective on language and communication coming from 'semiotics proper' which would help to resolve some of the problematic questions in human being and knowing that cybersemiotics addresses. I am referring to the idea of 'modelling'.

The human *Umwelt*, according to Sebeok, drawing upon von Uexküll, is a model; or, put another way, various acts of modelling on the side of Innenwelt constitute the "objective" or "public" world of an animal species as *Umwelt*. Models are made up of signs: thus, semiotic systems are modelling systems. Put simply, modelling is "how the organism (via its *Innenwelt*) maps the world, and what, for that organism, the meanings of the objects are within it" ([32] p. 43). As stated earlier in relation to *Umwelt*, there are what initially seem like similarities here with 'languaging': a 'world' constructed out of signs, the idea of language as a cognitive capacity and language as constituting/constituted by the

'social' world of signs. Yet, there are qualitative, significant and telling differences. The first has been mentioned: that the human *Umwelt* — like that of all other species' — derives from the sensoria, making semiosis a sensorial/cognitive activity. Modelling, in this formulation, whilst species-specific, is a criterial attribute of life. From this point on, there are considerable differences between 'languaging' and 'modelling'.

In considering 'language', the first thing that needs to be stated is that it is the species-specific human form of modelling. Yet, there is a need to be absolutely clear that 'language' in this formulation is not just 'chatter', nor could it ever be, and, in fact, that it is not even as closely related to 'chatter' as is commonly thought. Sebeok ([33] p. 14) puts it like this:

> *All known living organisms communicate exclusively by nonverbal means, with the sole exception of some members of the species Homo sapiens, who are capable of communicating, simultaneously or in turn, by both nonverbal and verbal means.*
>
> *The expression 'by verbal means' is equivalent to some such expression as 'by means of speech', or 'by means of script', or 'by means of a sign language' (e.g., for use in a deaf group), that are, each, manifestations of any prerequisite natural language with which human beings are singularly endowed. However, not all humans are literate or can even speak: infants normally do develop a capacity for speaking, but only gradually; some adults never acquire speech; and others lose speech as a result of some trauma (e.g., a stroke) or in consequence of aging. Such conditions notwithstanding, humans lacking a capacity to verbalize — speak, write, or sign — can, as a rule, continue to communicate nonverbally.*
>
> *...*
>
> *The word 'language' is sometimes used in common parlance in an inappropriate way to designate a certain nonverbal communicative device. Such may be confusing in this context where, if at all, 'language' should be used only in a technical sense, in application to humans. Metaphorical uses such as 'body language', 'the language of flowers', 'the language of bees', 'ape language', or the like, are to be avoided.*

Culminating in his 1988 essay on modelling [34], Sebeok's work attests that what characterizes humans is not the commonplace post-Chomskyan argument that they possess the capacity for language (sometimes simply reduced to speech or 'chatter' rather than the potential for recursion) but the possession of a verbal faculty *and* a non-verbal faculty (cf. "apes *plus* language", [35] p. 5). What is known about early humans provides some important evidence for such a classification. It is thought that early hominids (*Homo habilis*, about two million years ago) harboured a' language', grammar or modelling 'device'in their brains. *Homo erectus* (about one and a half million years ago), with an increased brain size over his/her predecessor, also possessed the capacity, an as yet unrealized ability to develop a sophisticated human verbal communication system. However, verbal encoding and decoding abilities only came into use about 300,000 years ago with early *Homo sapiens*. Humans therefore possessed the capacity for *language* long before they started to implement it through *speech* for the purposes of verbal *communication*. Prior to the verbal form, communication would have taken place by nonverbal means, a means that humans continue to use and refine today (see [36] and [34]). *Homo habilis* and *Homo erectus* therefore appear to have had what Sebeok, following his 1988 adjustment of

Lotman's formulations, calls 'primary modelling'. *Homo sapiens sapiens* evolved secondary and (as the inevitable consequent) tertiary modelling.

The primary modelling system is the key concern, here, although the tripartition of secondary and tertiary modelling do need to be considered. Primary modelling in humans is the capacity for verbal and non-verbal communication. Speech, verbal communication makes up the domain of secondary modelling: in evolution, this is the result of an exaptation [37] of the primary modelling capacity for specific interactions among humans. Tertiary modelling is the extension, through inevitable mutation in social exchange, of primary and secondary modelling to produce cultural forms (including predominantly verbal ones — e.g., novels, non-verbal forms — e.g., paintings and mixed forms — e.g., theatre) which not only partake of the lower strata of modelling but also feed back to them (see [38]). The point to be made about primary modelling — a point that runs through Sebeok's post-1979, work but which was never offered in a definitive formulation — is that it is not only *not* a matter of 'language' conceived as 'chatter', but that it is not even a matter of communication conceived as message transfer (as might be discerned in non-verbal communication of hominids).

Instead, primary modelling is an acute and developing cognitive capacity to differentiate within an *Umwelt*. Sebeok [39] identified the first stirrings of differentiation or modelling at a threshold as lowly as the cell in its interactions, by way of the immune system and anxiety, with bodies outside itself. Far more complex forms of differentiation of an *Umwelt* are apparent in the aesthetic behaviour of animals [40]. That differentiation is a (by-)product of proliferating semioses which inevitably incur sociality. Since taking signs in isolation is invariably an act of extreme abstraction, the object of semiotics, even biosemiotics is concerned with this sociality of semiosis [41]. In a fashion that is actually allied to the generative aspect of the Chomskyan perspective (cf. [42]), Sebeok argues the evolutionary advantage of increasing differentiation or distinction of features of an *Umwelt*. The ability to perceive relations (as distinct from related things) and to cognize a superior number of elements of the world is seen as characteristic of humans — this is where language defines what it is to be human, and this is where sociality — the interconnectedness of signs that humans are able to apprehend — is crucial to the process.

In Sebeok's conception of modelling, the sociality that 'languaging' attempts to formulate is present, but there is, in addition, a means to factor non-verbal communication and to posit the continuity of species. As such, the phenomenon of 'language' is — yes — to be considered special, but — no — not to be considered as removed like a sovereign from all animals' modelling. Most importantly for the project of cybersemiotics, modelling allows two further ramifications. In its mapping onto Peircean categories [38], primary modelling is associated with Firstness, possibility and abduction. It is a fitting home for qualia both ontogenetically and phylogenetically, a 'pre-social' mode of existence for young humans and young humanity alike. Primary modelling is the realm of affect, of qualia on the way to differentiation and the well-spring of motivation which is moulded in secondary modelling (but is routinely forgotten by humans: see [23]). If first-person experience and its residues at the moment humans awake in the "four worlds" of natural surroundings, body-hood, inner world and the social world with other living beings ([5] pp. 120, 147) are to be found anywhere, it is in primary modelling. This promises to contribute to a new basis for theorizing the subject and for understanding the process of observation.

The second ramification is that modelling already embraces a theory of the observer. For Sebeok, it is axiomatic that "what a semiotic model depicts is not 'reality' as such, but nature as unveiled by man's method of questioning" ([43] p. 12), the tangled relations of *ens reale* and *ens rationis* in semiotically explicated scholastic realism [44]. He adds ([43] pp. 17–18),

> *In the age-old philosophical quest for reality, two alternative points of departure have been suggested: that the structure of being is reflected in semiotic structures, which thus constitutes models, or maps, of reality; or that the reverse is the case, viz., that semiotic structures are independent variables so that reality becomes the dependent variable. Although both views are beset by many difficulties, a version of the second view, proposed by the remarkably seminal German biologist, Jakob von Uexküll, under the watchword Umwelt-Forschung — approximately translated as 'research in subjective universes' — has proved to be in best conformity with modern semiotics (as well as ethology). The same attitude was expressed by Niels Bohr when he answered an objection that reality is more fundamental than the language which it underlies. Bohr replied: 'We are suspended in such a way that we cannot say what is up and what is down' (French and Kennedy 1985: 302). Signs have acquired their effectiveness through evolutionary adaptation to the vagaries of the sign-wielder's Umwelt.*

Moreover,

> *A complicating fact of life is that the bare act of observation entails a residual juncture that disturbs the system being observed. The essential ingredient, or nutriment, of mind may well be information, but to acquire information about anything requires, via a long and complex chain of steps, the transmission of signs from the object of interest to the observer's central nervous system. Its attainment, moreover, takes place in such a manner that this influential action reacts back upon the object being observed so as to perturb its condition. In brief, the brain, or mind, which is itself a system of signs, is linked to the putative world of objects not simply by perceptual selection, but by such a far-off remove from physical in-puts — sensible stimuli — that we can safely assert that the only cognisance any animal can possess, 'through a glass darkly', as it were, is of signs.*

Sebeok, as ever, was concerned with semiotics as a matter of negotiating illusion and reality, a matter of how to know which is which and how they are related. While Brier ([5] p. 119), concurs with Luhmann, that the general effect of systems theory is a 'de-ontologization' of reality but argues against this 'de-ontologization' in favour of pragmaticism, it should be noted that semiotics is a systems theory, too, as Sebeok [45] has most explicitly stated. It has had a project of de-ontologization which Sebeok cites with particular reference to the view of John Archibald Wheeler and the notion of the participatory universe. Indeed, Wheeler is a recurring presence in Sebeok's later books [19, 46–49] and his "highly imaginative rendition of the so-called Copenhagen interpretation" ([48] p. 38) is referenced to demonstrate that the universe "viewed as an autopoietic 'self-excited circuit' is necessarily dependent on life, 'mind', and observership" ([49] p. 16). The latter of these still needs development, but it is demonstrably present as a potential in semiotics.

Moreover, the notion of *Umwelt* is a de-ontologization, too. It is a matter of species 'knowing' but, in the process of modelling, it does not abandon being for the simple reason that an *Umwelt* is not just 'known' by species but it is their very mode of inhabiting. This is especially the case for Sebeok, of course, because he insists that life and semiosis are co-terminous. In a similar fashion, biosemiotics can also be said to harbour, apart from Sebeok's Wheelerism, the rudiments of a theory of observing in the idea of the 'semiosphere', a concept which complements modelling. Derived from Lotman's cybernetic and autopoietic formulation, its definition is extended by Kull when he suggests that "Semiosphere is the set of all interconnected Umwelts. Any two Umwelts, when communicating, are a part of the same semiosphere" ([50] p. 301). Thus, a domestic cat and its owner share the same semiosphere when they are each eating a portion of a fish that the latter has cooked for both of them. For feline and human, the fish is a component of what they understand as food. However, the ways that these two members of different species will relate to the food, how the food exists in their *Umwelten*, are very different — the cat's eating may be solely for survival, it may be totally dependent on its owner; the human might eat simply for pleasure, for specific gustatory experience, to partake of a cultural and culinary pursuit, to exercise some knowledge of the history of the fish and members of its species. It follows that the cat as observer and the human as observer are obviously very different. The main difference is that the human *knows* that s/he knows or, to put it another way, the human animal is a semiotic animal ([51]; most systematically in [52]) defined by the fact that s/he knows that there are signs.

Human knowing of the existence of signs, however, does not, on its own, necessarily entail a theory of the observer. There is still a need to develop the latter, as Brier ([5] p. 119) insists:

> *There are many arguments — even outside cybernetics and system science — for this philosophy of science and its basic epistemological conceptions to begin with the observer or the phenomenological position, thereby acknowledging that humans are knowers, even if we do not know why or how. It is important to acknowledge our existing ignorance in the area of what it is to know and how knowledge comes about. We must also acknowledge that we are observers co-existing in language with other humans in culture and society.*

Yet, in cybersemiotics' endeavour to institute this perspective, especially in biosemiotics, there is a tension that the current essay has attempted to stress. That is, as Brier argues, functionalist perspectives as exemplified by constructivism are not theoretically equipped to begin to explain the emotions and the fullness of first-person experience. Arguably, it could be added that constructivism may not even be able to produce an efficacious theory of the observer. It does seem that it is too willing to stop at the formulation that the result of human observation is 'undecidable'. Even von Foerster, who seeks progress beyond undecidability, and famously eschews solipsism by stressing intersubjectivity through the illustration of the man with the bowler hat ([53] p. 226), seems to concur with Maturana that for the human to recognize undecidability or mere distinctions in 'languaging' "is all that he or she can do as such" ([15] p. 9). In contrast, the noetic perspective on the realism dilemma introduced by semiotics suggests that the world in given particulars at least will finally be decidable, and that semiosis in *Umwelten* (at least in the *human Umwelt*) is workably reliable until such a time when greater efficiency in apprehending reality might be attained. In contrast to the nominalism of, say, poststructuralism, which figures humans as dominated by their sign systems, Sebeok's work, for example, is a prolonged realist but not naïve consideration of the spiralling complexity of human semioses and the

understanding of them coupled with a rueful awareness of how the institutionalization of knowledge and phylogenetic forgetfulness impede that understanding (see also [54]). There is little point in bemoaning the partiality of 'observership'; instead, a proper investigation of its role and the nature of its adaptations in the past and, especially, the future is needed, precisely along the lines that semiotics proposes as transcending the traditional realism/idealism opposition in all its many variations.

5. Biosemiotics and the Observer

One of cybersemiotics central aims — explicitly future-orientated like Sebeok's work — is to inculcate awareness of the observer into its theory of science; but it aims to do so with a conception of the observer which also embraces first-person experience. The indications of Sebeok regarding the participatory universe reveal that biosemiotics has a nascent theory of the observer, but just has not developed it yet. Kull's [55] short contribution regarding Σ-sciences and Φ-sciences, the latter focused on universal laws and quantitative methods, the former concerned with local semioses and using qualitative research, is a preliminary signpost in the return to Sebeok's concerns in this respect. Biosemiotics is placed firmly on the side of the former, a science of knowing rather than a science of laws. So, why is it imperative that biosemiotics develop the kind of awareness for which second-order cybernetics and constructivism have striven and which Brier extends with a demand for first-person perspectives?

First, while the concept of *Umwelt* has been refined, that of semiosphere has not. Hoffmeyer's version [56] differs from that of both Lotman and Kull in its suggestion that the semiosphere is partially independent of organisms' *Umwelten*. If biosemiotics is to carry out the qualitative research that is concomitant with Σ-sciences then it desperately needs to be able to conceptualize the environment in a rigorous fashion. The 'knowing' of species does not occur in a vacuum. Central to biosemiotic theorizing has been the goal of non-anthropomorphic observation. From Sebeok's discussions of the Clever Hans phenomenon in particular, there has been vigilance in semiotics regarding anthropomorphism and the pathetic fallacy. This vigilance amounts to an awareness of the role of the human observer in reaching conclusions about the natural world that are open to question; however, it supplements that awareness by an almost equally questionable quasi-objective position of non-anthropomorphism. In the past, avoidance of anthropomorphism was often like a plea of 'undecidability', that it was impossible to impute motivation or purpose in the constitution of an animal or plant (as if it was possible to do so with a human animal) and what remained was to simply catalogue the organism's interactions with its environment. Maturana effectively concurs with this when he writes

> To the extent that a living system is a structure determined system, and everything in it takes place through neighborhood relations between its components in the present, notions of purpose and goal that imply that at every instant a later state of a system as a whole operates as part of its structure in the present do not apply to living systems and cannot be used to characterize their operation. A living system may appear to operate as a purposeful or goal-directed system only to an observer who, having seen the ontogeny of other living systems of the same kind in the same circumstances in his or her praxis of living, confuses phenomenal domains by putting the consequences of its operation as a

whole among the processes that constitute it ([15] p. 21).

Recently, however, both teleology and purpose have been reconsidered, especially in biosemiotics [57]. In relation to this, it seems that both the *Umwelt* and the semiosphere contribute to a nascent biosemiotic concept of environment. To develop the theory of observation, 'knowing' in both the organism and its environment needs to be thoroughly embraced and explored by biosemiotics. The concept of structural coupling from some second-order thinking attempts this but, as has been suggested, it not only misses qualia but is overly functionalist and does not figure conflict. Furthermore, it is difficult to imagine how a functionalist-structural coupling could account for the ambivalent processes of symbiosis, such as aborted cannibalism, explained by Margulis [58], and from which individuality or difference arises from incorporation. One other factor that is absent from structural coupling is a stress on *difference*. In biosemiotics, arguably, difference is a key factor. The idea of 'semiotic freedom' [59], the ideas of agency [60], species specificity [61] and Sebeok's 'differentiation' all emphasize the differences of semiosis and the feedback on semiosis of species. *Difference* might be the pivot around which observation in biosemiotics could be further theorized. Certainly, it is difference that is in play in relation to the objects of biosemiotics, and it should be stressed at the same time that in the theory of *Umwelt* the object is never neutral for species (if not '+' — to be sought out — or '−' — to be avoided — the object is '0' — safe to ignore or of no immediate interest). The difference that is entailed by the non-neutrality of objects points to a dimension — "environment", but not just in the sense of the physical environment of organisms; "context", but not just in the sense of what is understood by a putative addresser and addressee – constituted by relations in a fashion not dissimilar to the systems theorized by second-order thinkers such as Luhmann. Crucial are the relations between the sensoria of the organism and whatever impinges on those sensoria. Deely ([62] pp. 127–128) explains:

> *Uexküll uniquely saw that the difference between objects of experience and elements of sensation is determined primarily not by anything in the physical environment as such but by the relation or, rather, network and set of relations that obtains between whatever may be in fact present physically in the surroundings and the cognitive constitution of the biological organism interacting with those surroundings here and now. Nor are those relations primarily of the type that antecede and hold independently of any such interaction. To the contrary. The relations in question are not mainly between the organism and what is sensed, those limited and partial aspects of the physical surroundings which are proportioned to and activative of the limited range of this or that sensory channel in combination with however many other cognitive channels the organism in question is biologically endowed with. No. The relations in question concern above all how the limited and partial sensory aspects of the physical environment are connected among themselves so as to constitute objects of experience, and this constitution depends above all on the constitution of the organism doing the sensing. For it is the interests of that organism, not the 'independent' nature of the source of the sensory stimuli, that is at issue in the perception as such that the organism finally acts upon and uses to orient itself within the environment for the purposes of its life and well-being.*

The distinctions made here are important: an animal's *Umwelt* is its 'objective' world — not 'subjective' as is so often assumed - and it is where an animal relates to 'objects'. The reason for this, fittingly, pertains to Deely's logical re-figuration of objectivity. He demonstrates that the world that seems to be wholly independent of humans—in the common sense of 'objective'—can never be such. Rather, it is a specific kind of mixture of that which is independent of, and dependent on, humans. As he maintains ([63] p. 11),

> *There are signs and there are other things besides: things which are unknown to us at the moment and perhaps for all our individual life; things which existed before us and other things which will exist after us; things which exist only as a result of our social interactions, like governments and flags; and things which exist within our round of interactions—like daytime and night—but without being produced exactly by those interactions, or at least not inasmuch as they are 'ours', i.e. springing from us in some primary sense.*

Objects are "what the things become once experienced" ([63] p. 11), bearing in mind also that experience takes place through a physical, sensory modality. In this sense, even such entities as unicorns or the minotaur can be considered objects *embodied* in the physical marks of a text. But Deely argues that a "thing of experience"—an object—requires more than just embodiment: the Colosseum and the Arc de Triomphe preceded us and are expected to exist after us; but the point is that their existence as such is the product of *anthroposemiosis*. There are plenty of things—such as some metals in the earth and some things in the universe, as Deely suggests ([63] p. 16)—that anthroposemiosis has not yet touched. Objects are thus sometimes identical with things and can even "present themselves 'as if' they were simply things" ([64] p. 18). Likewise, signs seem to be just objects of experience—the light from a candle, the scent of a rose, the shining metal of a gun; but a sign also signifies *beyond itself*. In order for it to do so, a sign must be: not just a physical thing; not just an experienced object; but experienced as "doubly related" ([63] p. 22), standing for something else in some respect or capacity (or, for short: in a context).

This is no small matter and is taken up by Brier ([5] p. 269). Any object, including the objects which are the focus of science, is dosed by experience. As such, science does not really deal with 'thinghood' pure and simple, no matter how extensively mechanist and materialist science purports to be concerned with the ontology of 'things'. In general, the concern of scientific research is objects, objects presenting themselves as things or, if the science in question is progressive and self-aware — that is, taking account of the observer, its own process of observation – objects on the way to revealing things. Where does biosemiotics stand in this respect?

Well, clearly biosemiotics and cybersemiotics share a grounding in the work of Peirce (and Poinsot before him — see [44]). For cybersemiotics, Peirce's pragmaticism is a "realistic type" of constructivism acknowledging the force of Secondness. It calls for an appreciation of the nature of objects whilst bearing in mind the restrictions placed on knowledge of objects by the brute force of reality. Therefore it is a 'realism', although, frequently, 'realism' in such debates tends to be castigated as "naive realism" (see, for example, Glasersfeld's 1991 tribute to Maturana's constructivism, [64]) which cybersemiotics clearly is not. For biosemiotics, Peirce is the provider of an evolutionary philosophy, a cosmology and a sustained consideration of purpose, causation and finality (see, for

example, [56]). All of these are germane to the consideration of the observer but, currently in biosemiotics, principally serve the task of banishing anthropomorphism in favour of Σ-sciences and a theory of knowing to serve the purpose of apprehending agency in nature.

Of course, anthropomorphism, as the Clever Hans phenomenon so extensively attests, has a lot to answer for. However, the banishing of anthropomorphism in both Φ-sciences (such as behaviourism) and in aspiring Σ-sciences (such as biosemiotics) should, perhaps, suggest a need for the latter to reconsider all the ramifications of the former. In its commitment to a science of knowing, its pursuit of 'meaning' *for* species (no mere sop to Cerberus) and its acknowledgment of the impediments that anthropomorphism has created, biosemiotics looks in the opposite direction from the Laplacean, mechanist, determinist overtones of mainstream science and the instrumentalist research establishment which upholds it. In its undergirding by the theory of *Umwelt* and semiotics, too, biosemiotics has, as argued already, a nascent theory of the observer. Cybersemiotics embodies the call to develop that theory. That may involve acknowledging that anthropmorphism can linger, or even be a beneficial part of scientific work. It may involve examining conflict in the natural world, initiated or engendered from either direction, between humans and other organisms. In addition, it would involve more detailed consideration of motivation and interest. Alternatively, it might involve the re-visiting of evolutionary principles in the theory of *Umwelt*, for while the survival of species is an indication of the workability of their modelling system, "Neither survival nor maximal dissipation of entropy is enough to explain the growth of systems with inner worlds of qualia" ([5] p. 377). Certainly, it would involve attention to those *relations* which obtain (in an almost Rumsfeldian formulation) between the 'knowing' accruing to organisms and the knowing by which they might finally be known.

6. Conclusions

The constructivism upon which cybersemiotics draws and which figures in its call for biosemiotics to inculcate a theory of the observer is not without its problems. In particular, 'languaging' has been argued to be a faulty concept which needs replacing with a more far-reaching and nuanced concept: modelling. Yet, it has also been noted that the realism of biosemiotics and contemporary semiotics in general has a 'constructivist tinge' — that is, semiotics and biosemiotics are neither reductively idealist in the modern sense nor *naively* realist in a premodern or modern sense: this is the case by virtue of their inherent (though often unrecognized) distinction of sign, object and thing; plus they have an implicit, but underdeveloped, theory of the observer. Similarly worthy of development are the concepts of qualia and motivation: we still do not know what, in full, is at work when we raise an arm. It is not simply the result of a rational or social instruction. One of cybersemiotics' conclusions from this is that there is a need to re-configure the repository of knowing practices to include consideration of qualia and other affective motivations. As part of this project Brier suggests ([5] p. 141) that knowing might encompass such practices as art, religion and politics/ideology. More recent work in cybersemiotics [13] has been circumspect about this suggestion, but there are many who would seek to elevate religion, at least, to the status of a 'knowing'. Another conclusion arising from cybersemiotics is that if our knowledge is so limited in relation to the 'simple' action of raising an arm, then we have to be careful with figuring the knowing of other organisms. What might be the motivations in the casual and

survival-based being of organisms, and how is it possible to tell which is significant? Should the attempt even be made to delineate what is and is not significant?

The options in these circumstances usually boil down to nominalism versus realism, or constructivism versus a naive realist position. These, of course, are false oppositions: as stated earlier, what is at issue is not 'perception' set against 'the real', but the *relations* obtaining between reality and illusion, between brute physicality and the sensoria of beings. These are the relations that are in play in the ongoing process of modelling, a component of which is the possibility of knowing. As such, then, the theory of the observer depends not so much on sophisticated self-reflexivity, but on an attitude, such as James' famous distinction [65] of 'tough-minded' and 'tender-minded', a distinction he eventually overcomes with reference to pragmatism. Even whilst biosemiotics is able to develop a theory of the observer, and even whilst it posits agency in nature as a 'fact' that science must consider, its 'tender-mindedness' sets it apart from the tired resignation of constructivism. As Eco puts it ([66] p. 3),

> *if the sign does not reveal the thing itself, the process of semiosis produces in the long run a socially shared notion of the thing that the community is engaged to take as if it were in itself true. The transcendental meaning is not at the origins of the process but must be postulated as a possible and transitory end of every process.*

It is not even the social sharing that is important here so much as the fact that semiotics looks forward, envisaging what work can be done. It anticipates that the observer might be understood through first-person experience, but that the observer resides in a (Peircean) community of interpreters. This might seem to coincide with von Foerster's constructivist conclusion that "Reality = Community" ([53] p. 227). However, for semiotics, biosemiotics and cybersemiotics, the matter is less simple than this formulation, even with its implications, allows. Von Foerster ([53] p. 216) argues for the use of the indefinite article in the noun-phrase "a reality", distinguishing between the two uses of the article thus:

> *The 'The-School': My sensation of touch is confirmation for my visual sensation that there is a table. The 'A-School': My sensation of touch in correlation with my visual sensation generate an experience which I may describe by 'here is a table'.*

Apart from the fact that he merely supplements one sense with another in retreating into experience from the possibility of the real, von Foerster has set up another false opposition as far as semiotics is concerned. Semiotics is of the 'the' school, but not because it relies on sensation as confirmation but because it is concerned with the *relations* between sensoria and brute physical reality. What semiotics strives for, then, is an ultimate equilibrium of experience such that the observer will be able to get as close as makes no difference to the thing which is beyond the sign and the object, and which is at the boundary of the *Umwelt*. Thus framed, this is what science, as knowing, tries to do.

Considering science in this way, religion, art, fiction, politics and ideology, in contrast, are relatively impoverished ways of knowing. They are first-person experiences, quasi-knowings, which do not evince a meaningful impulse to move beyond signs or objects or, indeed, in some cases, beyond first-person experience. They are the result of structures which are solely human in origin. Hence neurologists in the last decade have become interested in the parietal lobe's role in religious experience (for example, [67-71]). Or, to take a different example, the last fifteen years or so has seen widespread

unease regarding the ultra- or post-modern idea that the world is constituted only by shifts in power and that, effectively, nothing exists beyond the polis. New paradigms such as cybersemiotics exemplify this unease and attempt a new synthesis which nevertheless gives due attention to first-person experiences and their role in knowing. Yet, there is a need for caution, lest the concept of 'knowing' loses the ambition it might have had to reveal anything beyond the fact that there *is* knowing or to challenge the idea that whereof one cannot speak, thereof one must be silent. This is why the pre-Socratic disciplinary practice of semiotics places knowing within the frame of all nature and tracks the evolutionary advances of modelling.

Acknowledgements

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