

Ecosemiotics

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1. Ecology and ecosemiotics

According to Ernst Haeckel (1866: 286), who coined the term in 1866, ecology is the “science of the relations between the organism and the environmental outer world”, and more recently, ecology has been defined in a somewhat similar way as the “study of the interrelations between organisms and their environment [Umwelt]” (Vogel & Angermann 1977: 199). How can we define this environment with which the organism is ecologically interrelated? Some ecologists have adopted Haeckel’s view of an ‘outer world’. The environment, according to their view, is “the sum of all exterior (biotic and abiotic) conditions and influences concerning the life and the development of organisms” (Platt 1980: 265). Others have rejected the opposition between an outer and an inner world. In their view, organisms have both an exterior and an interior environment (Geist 1978: 18). This broader view of the environment is also the one adopted within the framework of biosemiotic studies, to which we will turn later on.

Originally a branch of biology, ecology has had an enormous transdisciplinary influence on other fields of study since scholars have become aware of the worldwide ecological crisis. Thus, we are now confronted with a philosophical ecology (Sachsse 1984, Schönherr 1985, and Attfield 1994), an anthropological human ecology (cf. Eisenbart 1979, Hutterer *et al.* 1985), an ecology of the mind (Bateson 1972), a natural philosophy of ecological thought (Trepl 1987 and Mayer-Tasch 1991), ecological literary studies (Kroeber 1995), and ecological ethology (Krebs & Davies 1978), an ecological history (Herrmann 1986), cultural history (Großklaus & Oldemeyer

1983), and sociology (Gärtner & Leisewitz 1984), an ecological aesthetics (Sturm 1979, Schönherr 1985: 133–145, Böhme 1992, Krampen 1993), an ecopsychology (Mogel 1984) or environmental psychology (Mehrabian 1976), an ecological theory of cognition (Gibson 1979), and in ecolinguistics (Nöth 1996: 13–15). Despite first allusions (Enninger & Wandt 1984, Haila 1986, Bouissac 1989, 1993, Koch 1992, Krampen 1992, Lang 1993), the concept of ecosemiotics has not yet been explicitly mentioned in the context of these interdisciplinary ecological studies.¹ However, there have been several directions of studies in sign processes which can be considered as ecological since they have investigated various kinds of semiotic relationships between organisms and their environment. It is the aim of this paper to discuss these approaches and to try to give an outline of the contours of a future ecosemiotics.

According to these premises, ecosemiotics is the study of the *semiotic* interrelations between organisms and their environment. This definition presupposes that the center of interest of an ecological semiotics is not a *homo semioticus*, but more generally, an *organismus semioticus*. Still more fundamental is the question concerning the relationship between the organism and its environment. Is it always of a semiotic nature, or is there at least always a semiotic aspect in this relationship, or do we have to distinguish between semiotic and non-semiotic environmental relationships? Should ecosemiotics be restricted to the study of interrelations between organisms, or are there also semiotic aspects in the interrelations between organisms and their nonorganic environment? Whatever the answer may be, ecosemiotics will be a study in sign processes that is not restricted to arbitrary and artificial signs. It will also, and perhaps primarily, be concerned with natural signs mediating between the organism and its environment. Ecosemiotics will have to be an approach to semiosis based on the assumption of a very low ‘semiotic threshold’ between signs and nonsigns if it does not reject such a threshold altogether.

¹ An exception is Francoeur (1994), where the term appears in a merely metaphorical way, referring to various contextual dimensions of the sign in the theater. — Only after concluding this paper did the papers by Hornborg (1996) on “Ecology as semiotics” and Tembrock (1997) on “Ecosemiosis” come to my attention. The background of Hornborg’s paper is in human ecology. Tembrock examines biological and evolutionary aspects of semiosis.

Elements of a future ecosemiotics on these premises can be discerned in theoretical semiotics, biosemiotics, evolutionary cultural semiotics (cf. Koch 1986, 1992, Coletta 1993 and the special issue on *Nature, Environment, and Signs* of *Zeitschrift für Semiotik* 18.1 [1996]), in semiotic aesthetics (cf. Sturm 1979, Krampen 1979, 1993), in the domain of linguistic semiotics (Nöth 1996) and in other areas of applied semiotics. Not all of these domains can be discussed in the following. In particular, the most interesting semiotic approaches to environmental debris and rubbish cannot be discussed here. References of interest in its context can be found in Culler's chapter on "Rubbish Theory" (1988), Posner's volume on the semiotics of nuclear waste (Posner, ed. 1990), and the special issue on debris of the *American Journal of Semiotics* (11.1–2 [1994]).

2. Historical models of the relation between humans and their environment

In the history of culture, the view that signs are omnipresent in the relationship between humans and their environment has a long tradition. The most radical view in this tradition is pansemiotism, which is the view that all environmental phenomena are semiotic in their essence. Historically, three major models of a semiotic relationship between humans and their environment can be distinguished, (1) the pansemiotic, (2) the magical, and (3) the mythological model (cf. Nöth 1990: 382, 188, 374).

According to the pansemiotic model of the relationship between humans and their nonhuman environment, nature is semiotic throughout, and the signs which we perceive in our natural environment are messages emitted by God or some other supernatural power. According to the magical model of environment semiosis, natural phenomena are equally messages, but their sender and manipulator, the magician, is a human, while its receiver, at least at first sight, is in our natural, physical, or biological environment. Finally, mythological models of human ecology have been culturally transmitted in the form of narratives which instruct humans about their place in nature, telling them what they can, should, and must do with their natural environment.

In the Jewish-Christian tradition, aspects of the pansemiotic approach to human ecology appear in the Old Testament. Thus, in the

Psalms, nature is described as a message from, or addressed to, God. We hear that "The heavens declare the glory of God" (Ps. 19:2), "The God of Glory thunder" (Ps. 29:3), or "Mountains and all hills, fertile trees and all cedars, animals and all cattle [...] shall praise the name of the Lord" (Ps. 148.9–13).

In medieval theology, the pansemiotic view of human ecology is part of the doctrine of the spiritual senses. According to Thomas of Aquinas (1224–1274), this spiritual sense consists in the conviction that "things [res] have their meaning in other things" (*Summa Theologica* I, 9.1, art. 10). In this tradition, the meanings of the things in our natural environment were codified by means of books, more precisely, theological treatises. The ultimate key to the interpretation of the environment was the Book of the Books, the Bible, but more specific treatises served as a supplements. Bestiaries, for example, informed about the meaning of the animals, and lapidaries informed about the meanings of stones. While on the one hand, books used to codify and decodify the meanings of environmental objects, the semiotic nature of the natural human environment was itself described by means of the metaphor of the environment as a book (cf. Curtius 1948:323–329 and Böhme 1986). Since both nature and the biblical texts had thus to be deciphered, it is no wonder that the same hermeneutic code that served for Bible exegesis was in use to interpret the phenomena of the natural environment. In accordance with the principles of Bible exegesis the spiritual sense of the environmental phenomena was equally subdivided into a tropological, an allegorical, and an anagogical sense. A simple example of this kind of multiple decodification of nature are the three spiritual senses ascribed to a rock in our natural environment (cf. Dunbar 1961: 19). In a tropological sense, a rock was 'that which each soul should be to its fellows', allegorically, a rock meant 'Christ', and anagogically, it was 'the foundation of the heavenly kingdom'.

A climax of the pansemiotic view of the environment was reached in the Renaissance doctrine of signatures (cf. Böhme 1986 and Nate 1993). Paracelsus (1493–1541) is a good example of a Renaissance scholar who developed an elaborate system of codes to decipher natural signs. Not only God, but also three other sign emitters (*signatores*) were the source of the messages of nature, according to Paracelsus (1591: 101). The first was *archeus*, an inner principle of becoming, the second was *astra* — its source was in the stars and planets — and the third kind of sign emitters other than God was the

human *signator*. The natural signs, the so-called signatures, which these *signatores* leave as indexical traces in our natural environment can be discovered in the human face (codified by physiognomy), in the lines of the human body as well as those of plants and minerals (chiromancy) and finally in earth, fire, water, and the stars (geomancy, pyromancy, hydromancy, and astrology). Furthermore, the signs of the environment codified in this way, according to the doctrine of signatures, evince an essentially iconic sign relation among themselves, since hidden similarities, analogies, affinities, and correspondences were assumed to exist between the objects of the world (see esp. Foucault 1966: 56–61). These correspondences were also interpreted as signatures. Thus, for example, the form of the seed of aconite, namely a dark globe in a white skinlike covering, was interpreted as a sign of the curative effect which this plant was believed to exert on the human eye, since the appearance of these seeds is much like that of human eyelids covering the eye (cf. Foucault 1966: 27).

Are these examples of pansemiotic views of the relationship between humans and their environment in Medieval and Renaissance times of a more than a merely historical interest? Of course, these world views cannot be considered as models of ecological thought in a modern sense. However, they have one thing in common with the ecological philosophy of our times: their basis is a holistic view of the universe, which emphasizes the unity of human beings and their natural environment. Opposed to such a world view is the dualistic model of the interrelation between humans and their environment, as it originated with Cartesian rationalism. It is a world view which has led to a cleavage between nature and mind, giving humans priority over nature and culminating in the view of man being the only measure of all things in nature. Such an anthropocentric view of the relation between humans and their environment has, in fact, also a Judeo-Christian tradition, since in Genesis 1:28, God tells us, "Be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl in the air, and over every living thing that moveth upon the earth." Misunderstood, this biblical guideline may be abused as a mythological model of an anti-ecological environmental behavior (cf. Bouissac 1989: 509–513).

3. Theoretical semiotics and ecological semiosis

Not all theories of semiotics are able or willing to recognize semiotic aspects in organism–environment interactions. For example, F. de Saussure's (1857–1913) anthroposemiotics is a semiotics without any ecosemiotic perspective. According to Saussure, "nothing" in the cognitive environment of humans "is distinct before the appearance of language" (1916: 111–12), and even human thought, without the shaping form of language, is an "indistinct mass", and "a vague uncharted nebula" (*ibid.*), in which nothing is defined by necessity. Such a linguocentric program of semiosis is bound to impede any prospectives for the study of the ecological determinants in the process of semiosis interaction of the organism and its environment (see further Nöth 1994a).

A theoretical semiotics of far-reaching ecological implications, by contrast, is the one of Charles S. Peirce (1839–1914). His interpretation of the interactions between organisms and their environment seems often to be a pansemiotic one, for example, when Peirce writes: "The entire universe is perfused with signs, if it is not composed exclusively of signs" (CP 5.448, fn.). However, Peirce distinguishes among the relations between the objects and the organisms in the environment of humans between those which are only of a dyadic and those which are of a triadic nature, specifying that only triadic relations between organisms and their environment can be of a semiotic kind. A merely dyadic and thus nonsemiotic organism–environment interaction occurs when the organism is confronted with something which presents itself as a "brute fact" or in an effect of mere chance. The environment in such a dyadic relation is experienced as "eminently hard and tangible; [...] it is forced upon us daily; it is the main lesson of life" (CP 1.358). Only when such dyadic interactions become triadic relations is the organism–environment relation transformed into a semiotic one.

In a semiotic interaction, the organism experiences its environment no longer in its immediacy as a brute fact, but interprets it with reference to a third, a "meaning", purpose, goal, or law which transcends the immediate environmental situation (see also Nöth 1994c: 3f.). Such triadic relationships of semiosis are characteristic of cognitive processes (cf. Nöth 1994b), goal-directed behavior, and more generally, any mental activity.

Semiosis in this sense is by no means restricted to processes in higher organisms, to culture and social convention. Any primitive biological organism already interacts semiotically with its environment when it *selects* or *avoids* energetic or material objects in its environment for the *purpose* of its own *survival*. Such triadic interactions of the organism with its environment constitutes a semiotic threshold from the nonsemiotic to the semiotic world. Peirce goes so far as to see the presence of *mind* in organismic nature when he writes: "The microscopist looks to see whether the motions of a little creature show any purpose. If so, there is mind there" (CP 1.269; see also Santaella Braga 1994).

Before such ecosemiotic guidelines began to be developed any further in the more recent history of semiotics (see below), another paradigm for the extension of semiotics to the environment of signs users was developed by Charles Morris (1901–1979). In his behavioral semiotics, the horizon of semiotic studies is equally extended from human semiosis to processes of sign production and reception of "living organisms" in general. Morris also emphasized the necessity of going beyond the syntactic and semantic dimension of signs in order to study, in the paradigmatic dimension of semiosis, the "origin, use, and effect" of signs in the environment of the organism (cf. Morris 1971: 366 f., 302). However, pragmatics after Morris has not really fulfilled the expectations of liberating semiotic studies from their anthropo- and logocentric bias.²

4. Biosemiotics of the relation between the organism and its environment

In the context of biology, the semiotic nature of the relation between the organism and its environment was first systematically described by Jakob von Uexküll (1864–1944) in his ecological *Theory of Meaning* (cf. Uexküll 1928 and 1940).

² Thus, Koch (1986: 40f. and 1992: 177f.) in view of the restrictions of pragmatics to the relations between emitters and receivers of signs, has postulated the extension of the semiotic triad of syntax, semantics, and pragmatics by means of a fourth dimension for the study of the ecological conditions of sign use and evolution in nature and culture.

Environment, according to Uexküll (1940: 158, 334), is not Haeckel's "outer world", but rather a subjective *Umwelt*³, consisting of an inner world as given by the organism's perception and specific operational world of practical interaction with the environment. *Umwelt*, in this sense, is the way in which the environment is represented to the organism's mind, and it comprises the scope of the organism's operational interaction with its environment. Because of the species-specific differences between organisms, their different needs, capacities, and perspectives of their environment, there are as many kinds of *Umwelt* as there are species (or even organisms). Every species and every organism can only perceive whatever the biological structure of its receptors, its brain, and its specific perspective of its environment allows it to perceive.

In this context, Uexküll (1980: 335) anticipates a position of the radical constructivism of our times, (cf., e.g., Schmidt, ed. 1987, Nöth 1990: 179), when he writes: "Whichever subject we might choose from the chain of animal beings, we will always find another *Umwelt* constructed around it, an *Umwelt* evincing everywhere traces of the subject, for every subject is the constructor of its own *Umwelt*."

The semiotic nature of the organism-environment relation according to Uexküll is most apparent in his model of the functional circle (Uexküll 1928: 8). It shows the organism (the subject) as a 'receiver of meanings' with perceptual and operational organs in an environment whose objects are defined as "carriers of meaning". The meanings and signs of this *Umwelt* are by no means transmitted from an exterior environment to the interior of an organism. Instead, there is a relation of complementarity between the *Umwelt* and the inner world of the organism. The carrier of meaning has the function of a "counter-structure" of the receiver of meaning (Uexküll 1928: 8). *Umwelt* and inner world thus constitutes a hermeneutic circle, for the organism's inner world contains, in more recent terminology, a cognitive model of its *Umwelt* so that we can conclude that the organism is not just a recipient, but a constructor of its own environment.

Uexküll's theory of environmental meaning has meanwhile become accepted as a classic of semiotics (Sebeok 1979, Th. v. Uexküll 1981). It is a foundation of biosemiotics (Sebeok & Umiker-Sebeok eds. 1992, Hoffmeyer 1996), where organism-environment relations are being investigated both at a micro- and a macrobiotic level. In the course of this research, it has become apparent that the

³ For the history of the concept of 'Umwelt' see Herrmanns (1991).

study of environmental semiosis is not restricted to relations between the organism's inner world ('Innenwelt') and its outer environment ('Außenwelt'), but that besides semiosis related to the outer *Umwelt* there is also a semiotics of the interior *Umwelt* within the organism. Sebeok (e.g., 1991) has introduced the term "endosemiotics" for the study of this domain. Ecosemiotics at this level of semiosis within the organism begins with the processes of cognition and recognition between genes, other genes, and antigens in their molecular biological environment with which they are in a relation of complementarity. At this level of ecosemiosis, we find the roots of binary oppositions which constitute structures and systems at higher and the highest levels of semiosis (Nöth, ed. 1994).

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Экосемиотика

Экологическая семиотика (экосемиотика) является наукой о взаимоотношениях между семиотическими факторами (*agent*) и средой семиозиса. Статья дает обзор основных подходов к этой проблематике. В области истории экологической семиотики изучаются разные концепции о взаимоотношениях человека и среды в средневековой доктрине спиритуальной сигнификации и в ренессансном учении о “signator”.

Из теоретической семиотики автор подробнее останавливается на концепции Пирса о семиозисе как взаимодействии между организмами и средой и на теории значения и “Umweltlehre” Юкская, разрабатывающих экосемиотический подход в рамках биосемиотики.

Ökosemiotika

Ökoloogiline semiootika (ökosemiotika) on teadus suhetest semiootiliste tegurite (*agent*) ja nende semioosilise keskkonna vahel. Käesolev artikkel annab ülevaate lähenemistest sellele valdkonnale. Ökoloogilise semiootika ajaloo osas vaadeldakse kontseptsioone suhetest inimeste ja nende keskkonna vahel keskaja spirituaalsete tähistuste doktriinis ning renessansi signatuuridoktriinis.

Teoreetilise semiootika vallas arutletakse Peirce'i teooria üle semioosisest kui triaadilisest vastastoimest organismide ja nende keskkonna vahel, ning Uexküll'i tähenduseteooria ja “Omailmaõpetuse” (*Umweltlehre*) üle, mis on ökosemiotilised teemad biosemiootika valdkonnas.