

# **Ecosemiotics and the semiotics of nature**

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**Abstract.** Ecosemiotics is the study of sign processes (semioses) in relation to the natural environment in which they occur. The paper examines the cultural, biological, and evolutionary dimensions of ecosemioses on the basis of C. S. Peirce's theory of continuity between matter and mind and investigates the ecosemiotic dimensions of natural signs. Ecosemiotics and the semiotics of nature are distinguished from pansemiotism, and the coevolution of sign processes with their natural environment is discussed as a determining factor of ecosemiosis.

## **1. The scope of ecosemiotics**

At the interface between semiotics and ecology, *eco-semiotics* is the study of *environmental semioses*, i.e., the study of sign processes which relate organisms to their natural environment. Ecosemiotics or *ecological semiotics* is related to several other ecosciences such as eco-ethology, human ecology, philosophical ecology, ecopsychology, ecological history or ecolinguistics (Nöth 1998, 1999). In contrast to these disciplines, which study various other aspects of the relationship between humans or animals and their *umwelt*, ecosemiotics focusses on how this relationship is mediated by signs.

In the field of semiotics at large, ecosemiotics is situated between the semiotics of culture on the one hand and the semiotics of nature on the other. *Culture* is involved since the way humans interpret their natural environment is determined by models developed in cultural history. *Nature* is involved not only since our own natural environment is the object of ecosemiotic research, but also since the orientation of organisms in prehuman life equally involves environmental

semioses. The field of ecosemiotics hence overlaps with the fields of bio- or zoosemiotics, but there is a major difference between ecosemiotics and the other domains of the semiotics of nature, which can be accounted for in terms of the distinction between the semiotics of communication and the semiotics of signification (cf. Nöth 2000a: 228). *Communication*, defined as a sign process which involves a sender and a receiver, occurs not only among humans, but also between all other organisms throughout the whole biosphere. Not only cultural semiotics, but also bio- and zoosemiotics are hence concerned with processes of communication. *Signification*, by contrast, which concerns sign processes without a sender, predominates in ecosemiotics, where organisms interact with a natural environment that does not function as the intentional emitter of messages to the interpreting organism.

The study of signification in nature raises the question of the semiotic threshold (cf. Nöth 2000b): What are the semiotic and the non-semiotic aspects of our natural environment? Is semiosis always or only sometimes involved in the interaction between organisms and their natural environment, or do we have to distinguish between semiotic and nonsemiotic environmental relationships? What is the role of natural and cultural signs in environmental semiosis? Should ecosemiotics subscribe to pansemiotic views, or should it contribute to the discovery of a threshold separating the semiotic from the non-semiotic world. However the answer may be, ecosemiotics will be a study in sign processes that is not restricted to arbitrary and conventional 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 non-signs if it does not reject such a threshold altogether.

## 2. Cultural ecosemiotics

The structuralist tradition of 20th century semiotics restricted its field of research programmatically to arbitrary and conventional signs. Natural semiosis in the environment of humans was not an object of its study. The approach to signs was linguocentric, and Saussure (1916: 113) declared, that thought considered before language, “is only a shapeless and indistinct mass, [...] a vague uncharted nebula”.

In this tradition, nature enters the semiotic scene only as a *referent* (or content substance) of language. Structures of nature are investigated as content structures of texts, in particular of mythical texts. In this sense, Greimas developed his *semiotics of the natural world*. The natural world, according to his semiotics, is merely “a place for the elaboration and practice of multiple semiotic systems” (Greimas & Courtés 1979: 375). This semiotics of nature is not a theory of natural semiosis, but a theory of how human culture interprets nature. Ecosemiotics in this vein is hence the study of the culturalization of nature. Let us call this approach *cultural ecosemiotics*.

The culturalization of nature has a long history. There are four main cultural models of a semiotic relationship between humans and their environment, the magical, the mythological, the metaphorical and the pansemiotic model (cf. Nöth 1990: 382, 188, 374). The *magical model* claims that human sign use can have a direct, unmediated influence on our natural environment. The magician emits a sign, such as “Let there be rain”, and the natural environment changes according to his command. The *mythological model* tries to explain the relationship of humans with their environment by means of narratives. The myth tells us what we can, should, and must do with our natural environment. The *metaphorical model* semioticizes nature only metaphorically: nature is (not literally) an enigmatic sign, a cypher, a hieroglyphic, a riddle, a book, or a code, that has to be deciphered in order to be understood (Rothacker 1979). The *pansemiotic model*, by contrast, claims that *all* environmental phenomena are ultimately and “really” semiotic in their essence. Nature is nothing in itself, but it is a sign of something else, which is not nature. The Jewish-Christian tradition, e.g., taught that the signs which we perceive in nature are messages emitted by God (cf. Nöth 1998: 335–336).

The distinction between the metaphorical and the pansemiotic views of nature is a matter of degree. There are many degrees between a “real” belief in the semioticity of nature and a merely metaphorical way of referring to nature as a sign. In contrast to the magical model of natural semiosis, according to which the magician is a human *sender* of signs, whose *receiver* is in nature, the pansemiotic model considers *nature* as a sender of signs. For example, in the Bible nature is described as a book that we can read or as a code that we must try to decipher (cf. *ibid.*).

### 3. Foundations of biological ecosemiotics in Peirce

The extension of ecosemiotics from the semiosphere to the biosphere in general has been criticized as an undue semiotic imperialism. Hartmut Böhme (1996: 20–21), e.g., finds it necessary to draw a clear line of division between intentional sign use, of which only humans are capable, and nonintentional semiosis, presemiotic, or even “material” processes in nature, such as perception and metabolism, respectively. On this basis, we should distinguish between ecology, presumably as a natural science, and ecosemiotics, apparently a humanistic discipline. However, such a dividing line between the semiosphere and the biosphere is neither in accordance with general semiotics, at least in the tradition of Charles Sanders Peirce, nor with theoretical biology in Uexküll’s tradition. (For von Uexküll’s ecosemiotics see Nöth 1998: 338–340.)

No doubt, Peirce was a biosemiotician, as Hoffmeyer (1993) has convincingly shown, and Peirce’s semiosphere certainly includes the whole of the biosphere. Among the agents involved in processes of semiosis he does not only mention animals such as “a chameleon and many kinds of insects” (MS 318: 205–206), microorganisms such as “a little creature” under a microscope (CP 1.269), but also “plants that make their living by uttering signs, and lying signs, at that” (MS 318: 205–206). There are three keys to the understanding of Peirce’s bold extension of the semiosphere to the biosphere: the theory of semiosis as a process determined by final causation, Peirce’s broad concept of mind, and his theory of evolutionary continuity from mind to matter (synechism).

#### 3.1. Teleology (final causation)

Teleology or final causation is Peirce’s common denominator of semiosis in nature and in culture (Short 1983; Pape 1993; Santaella Braga 1999). In human semiosis it appears in the form of intentionality and self-correction in the effort to approach the dynamic object of the sign to which we can never have any ultimate access. The principle of teleology in human semiosis is rather evident in the case of *communication* between a sender and a receiver, where we have the purpose of a sign producer and some effort of the receiver to understand the message correctly. Ultimately, anthroposemiotic teleology

appears, as Peirce puts it, “in the purpose of signs — which is the purpose of thought – to bring truth to expression” (CP 2.444n).

In the interaction of organisms with their environment, there is teleology in cybernetic processes which lead to homeostasis and equilibrium between the organism and its environment. Furthermore, there is teleology in any other tendency of the organism towards self-control, self-reference, directed growth with a telos from the beginning on, and finally in purposive behavior. In such interactions, the organism experiences its environment no longer in its immediacy as a merely material fact, but interprets the environmental world with reference to a third, a “meaning”, purpose, or goal, which transcends the immediate environmental situation (see also Nöth 1994: 3f.). Such triadic processes involving the organism, its purpose and its environment are processes of semiosis according to Peirce.

Semiosis in this sense is by no means restricted to 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*. Peirce goes so far as to see the presence of *mind* in this biosphere 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).

In spite of their common foundation in teleology, there are, of course also differences between anthroposemiosis and biosemiosis, but these differences are only a matter of degree: “Human acts of cognition differ from other self-referential and self-correcting processes by virtue of their greater degree of self-reference and self-correction. Human beings achieve this superiority through the creation of symbols, which represent and control our habits of action” (Oehler 1995: 269).

### 3.2. Mind and synechism

Mind, thought, and semiosis are basically synonyms to Peirce (Santaella Braga 1994). His radical thesis is: wherever there is semiosis, there is mind. Mind is not only in humans, but also in their natural environment. Peirce did not even believe in a dualism between matter and mind. Instead, he defended the general principle of continuity from nature to mind, which he called *synechism*. Instead of an opposition, there is continuity between the mind and the natural environment.

In times of ecological crisis, whose roots are in a Cartesian dualism between culture and nature, which has opposed humans to the rest of the natural world for centuries, Peirce's synechistic theory of semiosis in nature and culture offers a promising model of eco-ethical conduct (cf. Pape 1983: 8–9). It is a model which leads to the ecologically necessary insight that the human world is not opposed to the rest of nature, but that the relationship between humans and their natural environment is ultimately a relationship of the human being to him or herself (cf. Böhme 1992: 78).

### 3.3. Pansemiotism?

Peirce's theory of the continuity between mind and nature and his bold dictum that "the entire universe is perfused with signs, if it is not composed exclusively of signs" (CP 5.448, fn.) gives the impression of an idealist pansemiotism. However, Peirce is not a pansemiotician, since according to his triadic theory of universal categories, semiosis begins only with thirdness and not with firstness and secondness (cf. Nöth 2001: §3.). In particular, he distinguishes between those interactions of organisms with their environment which are only of a dyadic and those which are of a triadic nature, specifying that only triadic environmental interactions can be of a semiotic kind. A merely dyadic and thus nonsemiotic interaction occurs when the organism is confronted with something which presents itself as a "brute fact" or as the result 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.

## 4. Ecosemiotics of natural signs

In the history of semiotics there has been a long tradition of excluding the natural environment of sign users from the study of sign processes. Two semiotic dualisms have been developed in this tradition to justify an opposition between the sign and its natural environment, the dualism of the sign vs. the nonsemiotic world and the dualism of the natural vs. the conventional sign.

The exclusion of nature from semiotic consideration is characteristic of the tradition of semiotic rationalism. It culminated in Saussure's dyadic sign model, which ignores the object of the sign and declares that the world beyond the system of arbitrary signs is unstructured.

The exclusion of nature in the dualism between natural and conventional signs is of a different kind. Nature is acknowledged in the category of the natural sign, but the argument is that there is *no* nature in conventional signs. Augustine, e.g., defines the conventional sign (*signum datum*) as not given by nature, but arbitrarily stipulated and reached by consensus (*non natura, sed placito et consensione significandi*) (Doct. Christ. II, 37; cf. Clarke 1987: 20). Nature is thus programmatically excluded from the study of most forms of sign use in human culture.

Peirce's synechistic semiotics disagrees with both dualisms. His theory of the iconic and the indexical signs is a theory of both natural and conventional signs in one framework. Peirce also rejects the opposition between signs and nonsemiotic objects. According to his theory of semiosis, the environment of sign user is always meaningful, since "all objects are objects of signs" (Oehler 1993: 132). Furthermore, the object is not a mere referent beyond the sign, nor is it a mentally constructed object as the constructivists would have it. In his theory of the real or dynamical object, Peirce postulates an object actually existing in reality, but nevertheless ultimately inaccessible to our mind, or accessible only by a never ending asymptotic approximation.

The theory of the dynamical object gives an account of how our natural environment influences a sign process. According to Peirce, the dynamical object affects or even determines the sign (CP 1.538, 4.536). The effect of this environmental determination of the sign is twofold (Hausman 1993: 157): There is an effect of cognitive constraint on the interpreter, whose possibilities of interpretation are perceptually restricted by the object. In scientific semiosis, e.g., such constraints "lead and sometimes compel investigators to acknowledge and adopt certain interpretations in preference to others" (*ibid.*). Furthermore, there is an effect of teleology in so far as the never really accessible dynamical object, although it "resist" interpretation, is at the same time the goal of sign interpretation (CP 8.183).

But how can teleology be at work in the interpretation of natural signs without a sender? In communication, as we have seen, teleology is rather evident since there is a *purpose* of a sign producer and an interpreter's effort to understand as the guiding principles of semiosis. In the interpretation of natural signs, the teleological effect comes

from the dynamical object, from the semiotic control which the natural object exerts on the outcome of sign interpretation, the interpretant. Ransdell (1977: 173) illustrates this effect of teleology in the interpretation of a natural sign with the example of traces on the ground which are as yet uncertain indicators of the presence of a tiger. The control of the object on the interpreter in this case occurs “by further signs the unquestioned interpretation of which can go towards determining the correctness or incorrectness of the interpretation in question. Such further signs might be, for example, visual percepts of the animal, its smell, its roar [...] and so on”. Conventional signs and natural signs can thus be accounted for by the same semiotic principle.

### **5. Evolutionary iconicity between the human mind and its natural environment**

Ernst Haeckel, who coined the term in 1866, defined ecology as the “science of the relations between the organism and the environmental outer world”. It was Jakob von Uexküll (1928, 1940, 1980) who abandoned the dualism between the inner and the outer world with his constructivist thesis that the organism’s inner world contains a cognitive model of its outer world so that the natural environment can so to speak be found within, and not, outside of the organism.

Peirce, too, defends an antidualistic view of the outer world within the organism. His argument is that there must be an “affinity of the human soul to the soul of the universe, imperfect as that affinity no doubt is” (CP 5.47). This statement sounds Paracelsian (cf. Nöth 1998: 335–336), but its justification is derived from science, especially from the theory of evolution.

Peirce’s argument is that our knowledge of nature comes from our coevolution with nature which had the result “that the human intellect is particularly adapted to the comprehension of the laws and facts of nature” (CP 2.750). For example, we are able to understand the laws of mechanics not primarily because of scientific research in physics, but because these laws have molded our mind in its evolution and thus provided it with the capacity to the natural (abductive) discovery of these laws: “Our minds having been formed under the influence of phenomena governed by the laws of mechanics, certain conceptions entering into those laws become implanted in our minds, so that we readily guess at what the laws are” (CP 6.10).



There is hence a relation of an albeit imperfect iconicity between the human mind and its natural environment, and the evolutionary affinity between the human mind and its natural environment makes correct guesses about, and successful cognition of, nature possible. On these premises, Peirce finally concludes “that every scientific explanation of a natural phenomenon is a hypothesis that there is something in nature to which the human reason is analogous” (CP 1.316). Hence: “It is somehow more than a mere figure of speech to say that nature ficundates the mind of man with ideas which, when those ideas grow up, will resemble their father, Nature” (CP 5.591).

Peirce was an admirer of Emerson’s poem *The Sphinx* (cf. CP 7.425). In this poem there is a line which may be read as an expression of the principle of iconicity between nature and the human being. If we take the enigmatic sphinx as a poetic symbol of the natural environment that humans want to explore and the poet whom the sphinx addresses as a symbol of the human being, we understand that the personified nature here expresses the insight that nature is in us. Emerson’s *Sphinx* said it in the following words:

*“Who taught thee me to name?  
I am thy spirit, yoke-fellow;  
Of thine eye I am eyebeam.*

*Thou art the unanswered question;  
Couldst see thy proper eye,  
Alway it asketh, asketh; [...].”*

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### **Экосемиотика и семиотика природы**

Экосемиотикой называется наука о знаковых процессах (семиозисе) в связи с той природной средой, в которой они имеют место. В статье рассматриваются культурные, биологические и эволюционные измерения экосемиозиса в рамках пирсовской теории о связи между материей и духом и прослеживаются экосемиотические измерения натуральных знаков. Проводится разграничение между экосемиотикой и семиотикой природы с одной стороны и пансемиотизмом — с другой. Коэволюция знаковых процессов с их природной средой описывается как фактор, обуславливающий экосемиозис.

### **Ökosemiotika ja looduse semiootika**

Ökosemiotika on teadus märgiprotsessidest (semioosisest) suhtes looduskeskkonnaga, milles nad aset leiavad. Artiklis vaadeldakse ökosemioosise kultuurilisi, bioloogilisi ja evolutsioonilisi mõõtmelid, lähtudes Peirce'i mateeria ja vaimu vahelist jätkuvust käsitlevast teooriast, ja uuritakse loomulike märkide ökosemiotilisi dimensioone. Ökosemiotikat ja looduse semiootikat eristatakse pansemiotismist, ning märgiprotsesside koevolutsiooni nende loodusliku keskkonnaga kirjeldatakse kui ökosemioosisist tingivat tegurit.