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The circle and the maze: Two images of ecosemiotics

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Abstract. This article compares the work of Jakob von Uexküll and Charles S. Peirce to elucidate two contrasting yet connected images of ecosemiotics. The intent is not simply to oppose their work, but to explore a tension which has implications for the ethical dimension of this emerging discipline. Uexküll's functional cycle is associated with the image of a circle, which, while emphasizing the integration of organism and environment, is shown to invoke solipsism, and an overly deterministic depiction of ecological relations. Peirce's drawing of a labyrinth is taken to represent a maze, which, while exemplifying the evolutionary play of ecosystems, may entail a level of unpredictability that is catastrophically chaotic. The root of these diverging depictions is identified with the role of subjectivity in engendering semiotic relations in the work of both Uexküll and Peirce. Where the more regressive aspects of Uexküll's theoretical biology are mitigated by a teleological interpretation of life's underlying causality, orientating agency within Peirce's work depends upon attention to the idea of the self in his philosophy of signs. In conclusion, Eduardo Kohn's conception of an 'ecology of selves' is cited, and the status of the organism as a living symbol of its environment is reaffirmed.

Keywords: ecosemiotics; environment; Charles S. Peirce; Jakob von Uexküll; functional cycle; labyrinth; teleology; ecology of selves

If a primal scene were to be identified representing the conception of biosemiotics then Charles S. Peirce and Jakob von Uexküll may well be identified as the leading participants. Both Don Favareau (2006) and Jesper Hoffmeyer (2009: 355–357) align these two as major pioneers in the field. Peirce's contribution rests on his development of a philosophical system of semiotics which presented the evolution of organizational relations via a triadic logic – a system capable of encompassing both natural and conventional signs without presupposing their inexorable division. Uexküll is credited for his programme of scientific research developing from the assertion that, from a biological point of view, every living organism

must be understood in conjunction with an *umwelt* – an interactive version of its environment precipitated by the creature’s physiological means of accessing its surroundings. Where Peirce provided a depiction of the formal means by which not just humans, but all living organisms could be conceived as staking their existence on the efficacy of sign-relations, Uexküll provided a strong sense of the content of this realization, demonstrating that the behaviour of all kinds of forms of life depended upon the capacity to render external and internal events significant.

Conjoining these theories lays the foundation for biosemiotics by fusing sign science with life science, marrying Peirce’s sense of the generative potential of different kinds of signs, to Uexküll’s insight into the diversity and specificity of each living organism’s standpoint on a world. Like all the best primal scenes, this intellectual tryst embodies a kind of fantasy: in their own lifetimes neither the philosopher nor the biologist professed any knowledge of one another’s work, let alone met in person. Presiding over this imaginary union we might also single out Thomas Sebeok, given his own writings went so far in bringing the ideas of Uexküll and Peirce together. In this article I will once again juxtapose the ideas of Peirce and Uexküll, this time in the name of ecosemiotics. Yet, rather than aiming to seamlessly integrate their thought, my intention is to tease out a particular tension concerning the relationship between organisms and their environments as articulated by signs. To facilitate this comparison, I will refer to two images or figures of thought, examples of which are to be found in the work of Uexküll and Peirce respectively:

(1) From Uexküll’s *Theoretical Biology* (1926): a diagram representing a key concept within the development of his work: the *Funktionskreis*, or functional cycle, a loop of stimulus and response he proposed governed the basic behaviour of every sentient living organism (Fig. 1).

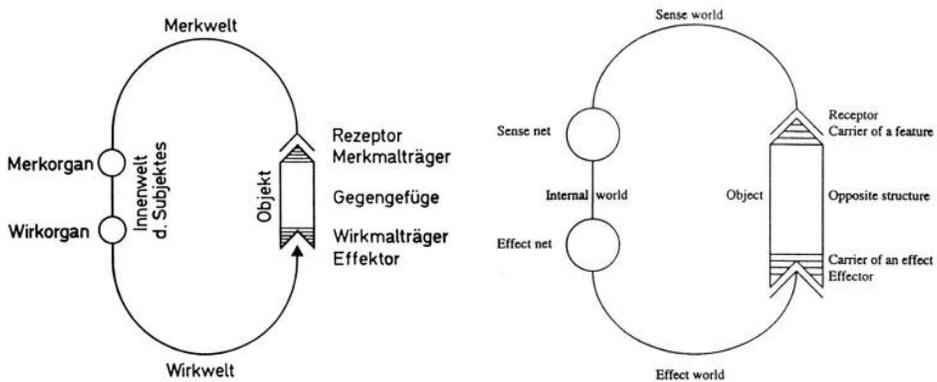


Figure 1. *Funktionskreis* or functional cycle (Rütting 2004, translated terms by Urmias Sutrop).

(2) From the Harvard Archive of Peirce's graphics and letters: an intricate line drawing made up of a network of intersecting passages, which appears to represent a maze or labyrinth (Fig. 2).



Figure 2. Peirce's labyrinth (Charles Sanders Peirce papers, MS Am 1537, Houghton Library, Harvard University, undated)¹.

¹ Accessed 18 January 2016 <<http://nrs.harvard.edu/urn-3:FHCL.Hough:5110311>>.

It is not true to say that these two images may stand sufficiently for the theoretical biology of Uexküll on the one hand, and the semiotics of Peirce on the other, as if each synecdochally exemplified the overall character of a system. Taken in isolation, neither image can be deemed wholly representative of the totality of its originator's work; rather, it is the exceptional character of each which deserves consideration.

While the circle, in the form of the functional cycle, is certainly central to Uexküll's account of the behaviour of individual living organisms, reduced to a material mechanism the sequence of cause and effect it delineates does not express the qualitative and teleological aspects of this structure, nor the more complex web of relations which exists between organisms of different species. What does make the circle stand out, however, is its general applicability as a figure encompassing both the ancient ideal of organic nature as a stable, harmonious system, and a relatively modern conception of natural processes as machine-like, autonomous, deterministic, and effectively inexorable.²

For Peirce, conversely, a more essentially representative model of his philosophy than the maze is to be found in the basic tripartite structure of the sign itself, and it is on this foundational element that the synthesis of Peircean semiotics with Uexküll's biology is based. Yet, the maze or labyrinth does convey something of a predicament that becomes discernible at the fringes of Peirce's philosophy: the inexhaustible capacity of relations between signs to generate new meanings, and the decisive role of spontaneity and chance in engendering these relations, introduces the possibility of a chaotic and even catastrophic unpredictability. It is in this capacity that the image of a maze evokes a comparable situation of uncertainty confronting attempts to respond to environmental problems at both a global and a local level. Ecological systems, in this schema, are not fixed in predetermined channels, whether virtuous or vicious, rather deviation becomes the rule as both natural and artificial processes continuously restructure the context of their emergence. Gregory Bateson aptly summed up the epistemological danger inherent in the assumption that this complex system may be conveniently segregated, and thereby mastered, when he wrote:

There is an ecology of bad ideas, just as there is an ecology of weeds, and it is characteristic of the system that basic error propagates itself. It branches out like a rotted parasite through the tissues of life, and everything gets into a rather peculiar mess. (Bateson 2000: 492)

² The opposition between an organic and a mechanical conception of nature has frequently been identified as a key theme within the history of the natural sciences. For example, Carolyn Merchant provides an account of both of these points of view in her book *The Death of Nature: Women, Ecology and the Scientific Revolution* (1990).

In outlining the difference between alternate visions of ecology my intention is not to drive a wedge between Peirce and Uexküll, obstructing the unification of their ideas within biosemiotics, nor to authenticate one at the expense of the other. In important respects, the images of the circle and the maze are mutually reflected within the work of both Uexküll and Peirce, and therefore best understood in tandem. Yet, they also indicate some of the contrary aspects of that newfound ecological consciousness, which today is tasked with apprehending the precarious place of the human within a potentially inhospitable global environment. In each case, it is not simply the insertion of an independent subject into the background of an environment which attracts attention; it is the contribution of a subject to the apprehension of this setting, and the reciprocal provision of a world to support the emergence of this subject, which brings the ethical dimension of ecosemiotics into focus.

Ecosemiotics and environmental crisis

As yet another addition to the lineage of biosemiotics, ecosemiotics has applied principles inherited from Uexküll and Peirce to conceptualize the collective interactions of organisms together with and within a shared environment mediated by signs relations. Much like ecology more generally, the field of study determined by ecosemiotics is not entirely settled. Papers published by Winfried Nöth (1998) and Kalevi Kull (1998) served to encourage interest in ecosemiotics, but early on a distinction was made between biological and cultural ecosemiotics (Kull, Nöth 2001). Whereas the former concerns the significance sustained by organisms of different species in the relationships they form together with an environment, the latter focuses specifically upon human relationships to the natural environment in terms of their semiotic basis. While this distinction may seem akin to familiar disciplinary conventions, for instance separating out human and natural geography, it is more nuanced in an important respect. Because ecosemiotics surveys not just the statistical flows of matter and energy that compose an ecosystem, but those contextualized patterns of semiosis that orientate and redirect the distribution of these flows, the tendency to subtract oneself from the picture that has traditionally characterized the modern scientific method is shown, from the outset, to be substantially incomplete. Perceptual observations are not necessarily neutral, but may, for better or worse, have drastic repercussions for the system in which they take place.

Timo Maran and Kalevi Kull (2014) have provided a list of eight key principles deemed central to ecosemiotics, intended to integrate different aspects of the field within a coherent framework. Of particular relevance here is the assertion that cultural phenomena represent both a part and a meta-level of the ecosemiotic network connecting sign relations with other ecological factors (Maran, Kull 2014: 45). The

semiotic processes that compose cultures are entangled within the ecosystems of which they form a part, yet at the same time cultural practices may aspire to model the significance of the ecosystem as a whole. From the vantage of ecosemiotics, the beliefs, customs, habits and practices which make up culture contribute to an environment which must incorporate its own limits in order to map and model the domain within which it is nested. The paradoxes apparently inherent in these statements have marked consequences for attempts to definitively isolate culture and nature from each other, both from a theoretical and a practical perspective.

With respect to its reconfiguration of natural and cultural categories, ecosemiotics can be connected with a number of other philosophical and theoretical interventions that have problematized the idea of nature in different ways. Several examples might be cited here; however, I will not dwell on the particular theoretical controversies distinguishing attempts to rethink the relations between nature, culture, and society.³ More poignant is an acknowledgement of those escalating practical problems stemming from the unanticipated consequences of human use of the environment. Overpopulation, rapid and excessive consumption of resources, pollution, species extinction, habitat destruction, and the prospect of catastrophic climate change – all these problems suggest that society is not just afflicted by the destruction of its environment. In its current form, society is culpable for the perpetuation of this destruction. In keeping with the ecological conditions that link such phenomena at the root, confronting these problems dictates that the natural environment can no longer be regarded as the remit of the natural sciences alone, or indeed be conveniently separated from other social, economic, and cultural issues. Properly understood, ecology is far from a nostalgic fantasy for some idyllic unspoilt scene of nature. No less than the vicissitudes affecting non-human organisms, ecological considerations may concern those injustices inflicted on minorities, the impoverished, and all those disenfranchised from the environment upon which their livelihoods depend.⁴

A key theme for biosemiotics has been the rapprochement of science and the humanities. Echoing Raymond Williams' appeal to overcome the legacy of nature

³ Bruno Latour's *We Have Never Been Modern* (1993) and Timothy Morton's *Ecology without Nature* (2007) represent two relatively recent and influential examples problematizing definitions of nature and culture. Yet, an emergent sense of the importance of this problem can be traced to an earlier time, through the writings of Marx and Engels, to the beginnings of Romanticism.

⁴ As perpetuated by the obfuscation of the link between natural processes and socio-cultural concerns, the degradation of the environment takes the form of what Rob Nixon has analysed as a "slow violence", a violence that occurs gradually and out of sight. It is the attrition of this slow violence which, by extending "the temporal distance between short-lived actions and long-lived consequences", has the most devastating effects on those made vulnerable by poverty and conflict (Nixon 2011: 41).

cast as an antithesis to the mind, in her book *The Whole Creature* Wendy Wheeler (2006) has identified biosemiotics with “a long and difficult revolution” in the history of ideas. At the contested frontier of this long revolution, liberal individualism continues to expose its own inadequacy in the face of a more holistic understanding of the constrained complexity that has sustained the evolution of culture. An alliance of the life sciences together with semiotics offers another framework for analysing those factors that complicate attempts to curb ecological degradation. As such, this promise might also benefit from a return to first principles, as in a critical reassessment of the distinctively associated images of environmental inhabitation that can be derived from the work of Peirce and Uexküll.

A Kantian heritage

As Sebeok observed, Uexküll and Peirce had each thoroughly assimilated the core Kantian principle that “‘raw experience’ is unattainable”. Via biology, Uexküll’s idea of the *umwelt* interjected a constitutive aspect of subjectivity into every attempt to apprehend reality. In developing his philosophical logic, Peirce proposed that access to ‘objects’ depended on the contribution of ‘representamens’ and ‘interpretants’ in a structure preceding and complicating the apparent immediacy of sensation. These doctrines demonstrated that “experience, to be apprehended, must first be steeped in, strained through, and seasoned by a soup of signs” (Sebeok 1991: 20). Yet, while they may have agreed on the need for a distinctive theoretical antidote to naive realism, the recipes they concocted were not necessarily wholly complementary.

Uexküll’s *Theoretische Biologie* (1973[1928]) was consciously conceived as an attempt to apply Kantian reasoning to a neglected frontier in the science of life, the domain of those subjective processes, irreducible to physical and chemical laws, which he maintained were the key to explaining the sentient activity of living organisms. As a biologist, Uexküll sought to ground these processes empirically, in both the physiological attributes of organisms and the relationships they formed with other objects and individuals. The internal regularity which seemed to govern the minds of animals could only be understood in terms of their activity, and in this respect a Kantian logic based purely on laws derived *a priori* was inadequate, or at least incomplete. All the same, Uexküll stressed the enduring merit of Kant’s work, as having clearly laid out those formal principles which composed the organisation of minds, and, first and foremost, for demonstrating that: “All reality is subjective appearance” (Uexküll 1926: xv).

Peirce’s philosophy, meanwhile, proceeded from a critical revision of Kant’s categories, replacing the latter’s twelve concepts of the understanding with a single trinity

which Peirce claimed was sufficient to unify experience. While Peirce affirmed the formative influence of Kant's philosophy on his own, and credited Kant's "Copernican step" as having opened up "the passage from the nominalistic to the realistic view of reality", he would go on to include Kant in his charge that "all modern philosophy of every sect has been nominalistic" (CP 1.19). In Kant's case this lingering attachment to nominalism was especially evident in the idea of the 'thing in itself' inaccessible to experience (CP 5.452), but it might also be connected with the inadequate understanding of logic and relationality which Peirce associated with German Idealist philosophy more generally.⁵

Both Peirce and Uexküll would likely attest that the Kantian notion of the reality of the object, as the product of mental action, was corroborated, not by idealist abstraction, but through scientific or pragmatic experimentation. Where they would perhaps part ways is in the identity and privilege they would assign to the agent of this experimentation, as, in a more contemporary parlance, an observer of observation, able to at once apprehend a world, and conceive of its own paradoxical capacity to take up a perspective on the differentiation of that world. Peirce and Uexküll would agree that knowledge of our environment is mediated and therefore necessarily conditioned, but in a certain respect their sense of the nature and origins of the experience of reality nourishing this knowledge was subtly different. Where Uexküll sought to explain how particular species of organisms proactively construct their reality through sign action, Peirce's philosophy presents sign action itself as a general factor presupposed in an emergent knowledge of reality. From a methodological point of view, for Uexküll the natural factor embedded in the embodied form of an organism took precedence over signs, whereas for Peirce signs themselves had a logical priority over the mind and body of the individual.

In both the English edition of his *Social Systems*, and the first chapter of his *Ecological Communication*, Niklas Luhmann remarks that a critical consequence of the Kantian semantics of the subject, which rose to prominence at the end of the 18th century, was the subsequent invention of an opposite relative to the subject: namely, the *umwelt*, or environment, as that which did not merely surround or contain the individual, but, through its differentiation, contributed substantially to the constitution of the individual's awareness and survival (Luhmann 1989: 1–7; 1995: xxxix). In Uexküll's work the decisive impact of this realization is patent. Uexküll went further than those who would define *umwelt*, environment, and milieu principally in physical terms, pre-empting a distinction between environment and

⁵ The precise relation of Peircean to Kantian philosophy may be disputed, though an affinity can be established over and above Peirce's own criticisms of Kant's work. Gabriele Gava's book, *Peirce's Account of Purposefulness: A Kantian Perspective* (2014), provides a thorough validation of one important aspect of this affinity.

world later made by Francisco J. Varela as the source of a “surplus of signification which haunts the understanding of the living and of cognition” (Varela 1991: 85–86).

In Peirce’s writings the connotations of this emerging concept of a constitutive relation between the subject and its environment are rather more obscure. Peirce’s opposition to psychological accounts of logic meant that he sought to define the workings of signs in the most universal terms, rather than on the basis of an individual’s perspective on a world. While phenomenology, or what he also called phaneroscopy, was an important part of Peirce’s philosophy, it was not so much concentrated on the point of view of the individual, as orientated towards those qualities, facts, and laws which attained the most elemental generality (CP 1.284). In keeping with the tradition begun independently by Franz Brentano and Edmund Husserl, Peirce held that the reality of mind must be understood as irreducibly intentional, but unlike these better known phenomenologists he did not present this stance as an inexplicable presupposition of thought (Hoffmeyer 2012: 103–105). For Peirce, the intentionality of mind represented the living sign of a relational semiotics that could neither be dismissed as illusory, nor abstracted from the emergent logic guiding material processes.

Uexküll’s circle

For Uexküll, environmental themes were of course paramount: the notion that every animal inhabits a specific sort of *umwelt* situated ecological together with ethological questions at the heart of biology. Each *umwelt* embodied a sphere of experience at once opened up and constrained by the blueprint of a species’ physiology. This schema established the relationship between organism and environment, as not just that of metabolic energy extraction, but as a dynamic generating sense and meaning. Just as the *umwelt* framed the organism, defining the limits of its potential, so, in turn, the sensory information it manifested enabled the individual to frame a portion of the nature by which it was confronted, carving out a relatively stable niche within unpredictable surroundings.

The crux of the bond between an organism and its corresponding *umwelt* was what Uexküll called the functional cycle. This concept developed out of Uexküll’s experimental research into muscular regulation. His early reputation as a scientist was secured by his discovery that the excitation of nerve cells is directed towards outstretched muscle, maintaining what would later become known as reafferent control (Rüting 2004: 39–40). This discovery demonstrated that the brain of an animal maintained a regulatory causal link with the muscular capacity of its limbs, enabling it to receptively adjust its movements in conjunction with changes to the objective of its activity. By supplying an example of the decisive role of negative

feedback within a biological system, Uexküll's research in this direction has been identified as a notable precursor of cybernetics. Taking the mechanism of negative feedback as a paradigm for their investigations, those active at the Macy Conferences in the 1940s and 1950s sought to elucidate parallels between technological and physiological processes, modelling the interactions between systems, information, and environments in a manner that would prove influential for both biosemiotics and ecological science. Yet so far as Uexküll himself was concerned, even more profound than the quantifiable dimension of this physiological dynamic was the realization that it must also be invested in a qualitative cognitive framework.

As Carolo Brentari (2015: 97–98) recounts, the notion of the functional cycle represented something of a watershed in Uexküll's thinking: the replacement of a chapter on "The reflex" with that entitled "The functional cycle" in the second edition of Uexküll's *Umwelt und Innenwelt der Tiere* attests to the importance of this shift. The introduction of this concept enabled Uexküll to integrate a sequence of stimulus and response together with the environment in which these interactions gained cogency, and to expose the question of the underlying cause of behavioural acts, which reflex models of behaviour failed to confront adequately (Brentari 2015: 98). The functional cycle illustrated the means by which the capabilities of a particular organism and the features attracting its attention slotted into one another, comprising a systematic whole (Uexküll 1957[1934]: 10). It schematized the process whereby the animal was at first able to recognise the implications of a particular object or event, and thereafter couple this manifestation with a practical response.

As Uexküll outlined in a diagram of the functional cycle, each impulse for action was arranged in a self-contained feedback loop, dividing the inner world of the organism into two halves (Uexküll 1926: 155–156). One half received those impressions derived from external stimuli, establishing a facet of the world as sensed, the other converted this information into a practical response, creating a world of effective action. The rules that dictated which features were available for recognition, together with the functions they triggered, were always specific to a particular species, being intransigently determined by the bodily organs this species possessed. This meant that the categories and values which human beings took for granted when making sense of their surroundings were inappropriate when it came to apprehending the *umwelt* of another species.

Within multiple iterations of different functional cycles chained together every possible aspect of a creature's experience was encompassed, incorporating every item of perception, along with every instance of behaviour. Cycles devoted to the physical medium through which movement took place, along with food, shelter, the threat of predators, and the attraction of reproductive partners, amounted to some of the most important functions eliciting and directing activity (Uexküll 1982[1940]: 33).

In effect, each animal was enclosed within a sphere of interlocking circles, a sphere commensurable with that occupied by individuals of the same species, but utterly inaccessible so far as the immediate experience of other forms of life was concerned. As Uexküll (1926: 42) put it, as a summation of its functional cycles the *umwelt* of an organism formed an invisible soap bubble, completely surrounding the creature within. Operating as both barrier and filter, the inner membrane of this bubble acted as a one-sided screen, behind which the depths of infinity were hidden.

Extending Uexküll's metaphor, together, the invisible bubbles of a multitude of *umwelten* formed a living foam, a foam remarkable not just for the vitality suspended within each of its bubbles, but also for the adhesive pattern that maintained overall unity. When it came to explaining the interaction of different species within the same habitat, Uexküll tended to employ metaphors associated with music, to evoke the overarching plan he believed maintained order within nature (Clements 2011). Through the set of rules implemented by each of its functional cycles, every species pursued the equivalent of a different melody, with its population representing a different set of instruments within an orchestra. By composing the natural factors intrinsic to each organism, Nature's plan worked like a symphony, ensuring that the closed autonomous *umwelt* of a particular form of life was arranged to intersect harmoniously with those of other species. In this way predator and prey could effectively know, and so pursue or avoid, one another, acting in concert despite inhabiting intrinsically incommensurable versions of reality.

Uexküll's conception of a natural factor, guiding the activity of organisms, while remaining definitively unknowable, inevitably presents problems when met with a more contemporary understanding of ecological evolution. What Brentari (2015: 114) calls Uexküll's *fixism*, i.e. the conviction that the behaviour and physiology of every animal species was consistently predefined, precluded direct access to the environments of other species, even as it conveyed the diversity of their respective worlds. Furthermore, the notion of a natural factor innate within the structure of every organism makes it difficult to avoid the characterization of evolution as a kind of preordained historical narrative, rather than an open-ended, indeterminate, and so genuinely creative process. On this basis, Uexküll's ostensible faith in an overarching harmony prevailing in nature can all too readily be criticized as naive, an indulgence of that presumption of a self-correcting natural equilibrium, which, more than once, has blighted ecological interventions.⁶

⁶ In his *Discordant Harmonies* (1992), Daniel B. Botkin has provided a brief history of the fallacy that natural processes spontaneously attain balance, along with several examples of its destructive repercussions. It is worth noting that Botkin's critique is applied just as vigorously to the mechanistic depiction of nature as a vast machine, as it is to the antithetical organicist or vitalist standpoint to which Uexküll more readily seems to subscribe.

What remains highly pertinent within Uexküll's work is his intense interest in the diverse yet singular relations between living systems and their environments, relations which he rightly surmised could not be straightforwardly reduced to a sequence of causes and effects, without due consideration to the self-referential character of observation. Arguably, in so far as our access to a globalized environment is limited both by the fragmentary condition of scientific knowledge, and the socio-economic constraints which curb coordinated action, we remain beholden to an impoverished version of those interlocking circles which Uexküll identified with the functional cycle. The question is what this image of ecosemiotics represents, when stripped of the reassurance that nature preserves an ideal state of order ready to be reinstated?

Uexküll recognized that human beings tended to cut loose from the *umwelt* into which they were born, founding a view of the objective world on the basis of symbolic abstraction, and thereby building up an image of reality which surpassed the immediate experience of their senses (Uexküll 2001[1936]: 109–110). He also regarded this idea of objectivity as in the end provisional, being predicated upon those basic functional cycles which allowed human individuals to negotiate their surroundings. The technologically mediated existence which, already in Uexküll's time, had come to typify modernity, instituted an especially hubristic idea of the objective, since it tended to detach and distort the distinct *umwelten* into which individuals were embedded.

At base humans were strangers to one another, unable to see past the contingencies colouring their view of reality. With this idea in mind, Uexküll (1926: 97) compared the human *umwelt* to a theatre:

It is most unfortunate that we can never behold the consciousness-stage of another living being; nothing would be more instructive than to see the world through the schemata of another. But at least let us never forget, as we watch our fellow-men going to and fro around us, that they are treading the boards of our stage, and we theirs. The stages are never identical; in most cases, indeed, they are fundamentally different. And we can never hope to play on the stage of others the role that we play on our own.

Despite the bond organizing their proximity, each *umwelt* remained inviolable, since the individual it contained could only communicate with its peers by proxy, i.e. in accordance with those prescribed forms which governed its relations. At its most affirmative the image of ecosemiotics that Uexküll grants is that of a resonant biological universe, rich in sense and feeling, but in its bleaker aspect this image also invokes isolation, as if every individual organism were ultimately confined to its own private circular cell.

Peirce's maze

Compared to Uexküll, the role of the environment within Peirce's work is much more oblique. Peirce did not discuss ecological issues in any detail, and – unlike some of those Pragmatic philosophers whom he influenced, notably William James and John Dewey – he rarely referred to the environment as a significant concept in its own right. Nevertheless, the importance of relationality and context to the analysis of semiotic structures helps to justify a reading of Peirce's work attuned to its ecological implications. As Maran has highlighted, there is evidently an intuitive resemblance between Peirce's portrayal of semiosis as a process of dynamic growth and those transitional processes which contribute to the natural history of an ecosystem (Maran 2007: 270). Where natural ecology charts connections between environments and organisms via the succession of generations, food chains, and the cycling of chemical substances, Peircean semiotics traces the passage of signs linking objects and interpretants, by way of those feelings, habits, and inferences of mind which serve to harbour these vectors of reference.

A key factor justifying an ecologically inclined re-appropriation of Peirce stems from the philosopher's appreciation of the value of evolution in explaining patterns of natural development. This appreciation extended not just to Darwin's theory of natural selection, which Peirce greatly admired for emphasizing the role of 'fortuitous variation', or what he called Tychism, in establishing physical laws. It also stretched to the principle of habit-taking, which Peirce associated with Lamarck's account of evolution through the transmission of acquired characteristics (CP 6.299). And further, to his own notion of Agapism, a power of sympathy which Peirce held impelled the evolutionary development of ideas through mutual attraction and collaboration (CP 6.307). Both Tychism and Agapism represented essential compliments to the mechanical necessity, or Anancism, which Peirce perceived was already unduly privileged by many of Darwin's followers, in their emphasis on competitive struggle, fitness, and adaptation as the primary motors of evolutionary change. Offering a sentiment that seems to foreshadow something of Uexküll's ecology, Peirce proposed that in nurturing ideas "[t]he movement of love is circular, at one and the same impulse projecting creations into independency and drawing them into harmony" (CP 6.288). Yet, with respect to the image of the environment latent within Peirce's philosophy, it is his conceptualization of the mind as the vessel of evolutionary ideas that proves most revealing, and here his possible differences from Uexküll become more pronounced.

In a critical reconfiguration of what might be deemed our common-sense understanding of experience, Peirce did not locate the mind, as a purely spiritual point of view, on the one side, and the world, as material nature, on the other.

Rather than being something shut up in a skull which was then surrounded on all sides by the outer limits of the environment, the mind was itself open, externalized in the form of those intelligible patterns which characterized natural development. Consciousness and the inward aspect of feeling were not the essential attributes of mind; this misunderstanding arose from the fact that biological organisms, especially those endowed with a nervous system, tended to exemplify the possession of a mind (CP 7.364). Additionally, matter was not wholly indifferent or mindless; it was “nothing but mind that had such indurated habits as to cause it to act with a peculiarly high degree of mechanical regularity” (CP 6.277). As these premises suggest, for Peirce the mind was not absolutely individual. Instead, it articulated the lively reality of generality, conveying the logic of relations between individuals, rather than being confined to any particular substance or body.

Peirce’s idea of mind can be affiliated with a number of other inter-related concepts within his system. The mind was informed by Thirdness, as the predictive mediate relation between Firstness, which stood for the singular quality of a possibility, and Secondness, which invoked the particular force of an action (CP 1.537; CP 5.469). As the recipient of a sign, and the means by which its relation to an object was represented, the mind situated the interpretant, thereby producing a mental or physical effect, as in a feeling, exertion, or the notion of another sign (CP 2.493–4). By allocating a triadic structure to signs, Peirce moved beyond a simplistic dualism connecting the thing to a corresponding signifier, and avoided polarizing the mental aspect of signs and the physical objects to which they referred. His semiotics called attention to the diverse means by which information may be transported from a particular thing into a new context, emphasizing the pragmatic generation of significance that this process of displacement entailed. In effect, as the site of an interpretant introducing collateral information in order to determine the identity of a sign, a mind or quasi-mind acted as a localized instantiation of the environment.

Although human beings maintained specialized access to signs, this did not mean that those minds involved in semiosis were exclusively human. Peirce was frequently evasive when it came to discussing this issue of non-human signs. For good reasons, partly connected with his interest in formal logic, he tended to concentrate on sign usage by or between persons. Nevertheless Peirce provided plenty of hints within his writings justifying an account of semiotics substantially opposed to anthropocentrism. For Peirce, signs not only passively rendered the world legible on behalf of an observer – through the complex patterns informing their growth they were actively involved in the generation of a world. As the embodiment of signs and a process orientating the development of everything, from bee hives to crystals, thought, Peirce argued, was in evidence throughout the purely physical world (CP 4.511); signs must therefore play an active role in the formation of nature as well

as knowledge. A plant which extracted nourishment from sunlight, and the animal which set out to eat this plant, even the weather system which added fresh water to the mix, insofar as they contributed to intelligible relations, all of these incidents already implied the production and interaction of signs. The presence of a bystander able to picture and pass on news of these events was not primary; rather, in its own right every fact preserved or predicted by way of a sign contributed to a process of ecological evolution.

Integral to the growth, which Peirce claimed was a primordial element of the universe (CP 6.157), was the fact that the interpretant of a sign could in turn become another significant object, with its own potential for engendering semiotic relations. Successively, every representation might become the basis of another representation in an endless series (CP 1.339). Abstraction, as the process by which a thought-sign became the object of another thought-sign (CP 4.549), was not just the business of scientific investigation; for Peirce, it also represented the means by which reality acquired complexity. Like an organic tissue of interwoven strands, signs grew. And, by recursively articulating and deciphering their own significance, signs evolved along with the universe itself, introducing new patterns, habits, and laws into existence.

As a stylized portrait of that tangled web of signs which was both the nexus of every mind and the medium by means of which the universe gained coherence, Peirce's drawing grants us a limited sense of what his image of ecosemiotics might amount to. Admittedly, Peirce himself did not specify what this drawing was supposed to represent, but Sebeok (2001: 75) for one was unable to resist imagining a depiction of the labyrinth of signs in which every interpreter is eternally destined to wander. Although this drawing is not itself a formal diagram, Peirce did identify his attempts to devise a graphical method for representing logical propositions with a childhood predilection for solving mazes. He recalled that his logical bent allowed him to take pleasure in the act of tracing paths upon a map of an imaginary labyrinth, in the hope of plotting a route to a central compartment, and professed that this was yet another way of performing experimentation upon a diagram (CP 4.533).⁷

As a frame of nature, the labyrinth implies at least one critical difference from a circle or a soap bubble. The labyrinth does not simply border the space it contains in the manner of an empty vessel. Like the convoluted folds of a cerebral cortex, or like the ventriculated interior membrane of the body, a labyrinth coils its limits

⁷ The same enthusiasm may have prompted Peirce to entitle his final series of articles in *The Monist* "Some amazing mazes", and to begin with an epigraph quoting Milton:

Mazes intricate.

Eccentric, interwov'd, yet regular

Then most, when most irregular they seem. (CP 4.585)

within itself, filling out the volume which it serves to frame. While a uniform circle or sphere defines an interior and an exterior in term of a single distinction, through its twists and turns a labyrinth differentiates this difference in a variety of ways. In short, a labyrinth may reinvent, rather than circumvent, the extent of a dimension. Returning to the idea of interpretants becoming the object of further interpretants, what from one point of view represents potentially infinite regression, from another becomes a source of generative digression.

Still, for Peirce, beyond the positive aspect of the maze as an opportunity for exploration, there was another side to this theme, which perhaps had as much to do with anxiety as it did with curiosity and play. In the synopsis of one of the many books which Peirce failed to complete, he wrote portentously: “We find ourselves in the vestibule of the labyrinth. Yes, The Labyrinth – in the Vestibule only, but yet in that tremendous, only Labyrinth” (CP 2.79). While the implicit danger of Uexküll’s vision was that of individual segregation and solipsism, the occupant of Peirce’s labyrinth ran the risk of becoming irredeemably lost and confused, abandoned in a world endlessly appending new avenues, and therefore always apparently on the brink of oblivion.

In *From the Tree to the Labyrinth*, Umberto Eco (2014: 51) associates Peirce with the problem of engendering too much, rather than too little knowledge, identifying the potentially infinite and therefore unstable structure of encyclopaedias with Peirce’s principle of unlimited semiosis. The corresponding vertigo of the labyrinth is triggered by a paralysing excess of choices, and the failure to forget the significance of each (Eco 2014: 76–78).⁸ Similarly, Murray G. Murphey (1993: 301) suggests that the early development of Peirce’s logic ended up relegating the real to an interminable series of cognitions: “[a]s a result, Peirce’s position degenerates into an extreme form of subjectivism in which we are lost in a phantasmagoric maze of our own concepts”. If with his semiotics Peirce’s ambition was to discover at last a *Mathesis Universalis*, devising a single universal frame for nature, then his system runs the risk of blurring the boundaries between individuals and the world to the point of collapse. In this case, it is not a lack of understanding or empathy which undermines attempts to preserve the natural environment; it is the prospect that every new decision can only make matters worse.

⁸ As another example, Eco cites Jorge Luis Borges’s story “Funes the Memorious”, the story of a man whose prodigious memory persists to such an unbearable degree that rational thought is made impossible by the recollection of minute particularities and irrelevant details (Eco 2014: 75). This stress on and of the particular can be contrasted with a sense of general forms, which depends on a degree of vagueness and redundancy.

The vanishing subject

From an ecological standpoint, what Peirce and Uexküll shared was the insight that the changing nature of the environment encompassed the distribution of signs as well the transference of energy. Just as the work of bodies served to accumulate or exhaust supplies of energy, the communication of signs and their emergence within the *umwelt* of an organism involved the encryption or expression of meaning. Vital to appreciating both of these two images of ecosemiotic framing is the principle that a context does not simply surround the situated individual impassively. In its differentiation, context supplies a mind with information, constitutively inscribing a site with signs, and investing those signs with the potential for interpretation. For this reason, the framing of nature is always double: the apprehension of an environment frames the significance of the natural world, yet it is also the pretext of a frame which cultivates the capacity for identifying significance in the first place. Where Uexküll and Peirce differed is in the role they initially attributed to the inhabitant of a given environment or context.

For Uexküll, regulating every functional cycle, and so leading the way at the centre of each *umwelt*, was a subject. It was this subjective aspect of the organism that animated an environment, enriching it with meaning, and converting what would otherwise remain an undifferentiated surrounding into the lived experience of a world. From this subjective side, an *umwelt* was not unlike Peirce's labyrinth: Uexküll envisaged each subject weaving its relations like the threads of a spider web, fabricating a network which served to sustain its existence. By virtue of its subjectivity, every animal, from the simplest to the most complex, formed a perfect couple together with its *umwelt*. As a law unto itself, even an individual cell could be deemed a subject, since its activity followed a set of prescribed rules which Uexküll insisted were irreducible to any mechanical process. What varied was the degree of complexity this relationship entailed: the simple animal inhabited a simple *umwelt*; the multiform animal dwelt within an *umwelt* as richly articulated as its own physiology. In either case, it was this subjective core which ensured that the organism as a whole acted in accordance with nature's plan.

The problem that this conviction seemed to entail was that of ever finding empirical evidence of where this spirit of subjectivity might originate. Although Uexküll was happy to attest that the subject "lies concealed, eternally beyond the reach of knowledge" (1957[1934]: 80), on occasion he seemed unable to resist the temptation to provide proof of this inexplicable essence of life. He veered closest to vitalism when contrasting the mysterious qualities of protoplasm with the functional framework in which this material was contained. As the remarkable "living" substance enshrined in every cell and apparently capable of spontaneous regeneration, protoplasm seemed to embody a transcendent subjectivity directing

life (Uexküll 1926: 114). Through the course of the 19th century many scientists had come to see living processes as a consequence of the organizing properties of protoplasm, and this trend persisted during the first half of the 20th century. Unlike those, such as Thomas Huxley, who had viewed protoplasm as verifying the materiality of vital forces, Uexküll pursued the opposite conclusion: the morphogenesis of protoplasm represented evidence of “supermechanic properties” which resisted empirical analysis (Brentari 2015: 65–70). The “perfect machine” embodied by the organism’s physiology was created, ruled, and regulated by the non-material order inaccessibly embedded in protoplasm (Uexküll 1926: 123). In fact, as genetics would eventually establish, neither account of protoplasm was adequate, although the flaw in both a materialist and neo-vitalist approach to the question of an essence of life runs deeper than a failure to examine the chemical composition of cells in enough detail.

What obscures matters in the analysis of protoplasm, eliding the depth of Uexküll’s own insight, is the identification of the subjective aspect of an organism as a *cause* in a sense already unduly diminished by the prejudices of scientific modernity. The difficulty was not the postulated existence of a biological factor supplementing the sequential execution of a physical cause and material effect, so much as the push to establish the cause of that which, apparently by definition, was without a cause. Understood in these deterministic terms it was inevitable that Uexküll’s reference to an unknowable natural factor must perpetuate a self-defeating pattern of circular reasoning, and make it difficult to avoid the conclusion that, much like the Cartesian *cogito*, the presence of an irreducible subject was presumed to be relevant before the question of its existence was even asked. As Maurice Merleau-Ponty (2003: 176) memorably remarked, by consolidating a chain of objects within experience without itself becoming an object, Uexküll’s notion of the subject acted like “a pure wake [...] related to no boat”; it left behind the traces of a disturbance without evincing the involvement of anything other than a phantom culprit.

In contrast to Uexküll, a sustained philosophical analysis of the subjective is glaringly absent from Peirce’s writings. His scattered references to this topic were principally dismissive, as he explained in a letter to Lady Welby:

I do not make any contrast between subject and object, far less talk about ‘subjective’ and ‘objective’ in any of the varieties of the German sense, which I think have led to a lot of bad philosophy, but I use ‘subject’ as the correlative of ‘predicate’, and speak only of the ‘subjects’ of those signs which have a part which separately indicates what the object of the sign is. (Peirce 1953: 24)

This characterization makes the role of the subject for Peirce seem largely contingent, the product of an ongoing process of semiosis rather than the proponent. Although

required tangentially in so far as the sign of a given object implies a destination, it is the contextualized determination of the interpretant, rather than the will or conscious reflection of the subject, which endows a sign with meaning. This is not to say that subjective dispositions, such as intention for example, were irrelevant. Far from it, intention could make the difference between an insignificant accident and an event which deserved decoding. What was important here was not the subject's alleged capacity to contrive an occurrence beyond any physical mechanism. What mattered was that intention implied a situation sufficiently complex to justify continued interpretation. Like any meaningful event, an act of intention involved not just cause and effect, but a third factor contextualizing and thereby interpreting the connotations of object and sign. In this role a subject supplied no more than the blank surface upon which a form or character may be inscribed, a grammatical and logical structure associated with the predicate, rather than the metaphysical locus of individual agency.

It may seem unsurprising then that Peirce was frequently derisive when it came to considering our distinctly human preoccupation with the identity of the subjective self. He compared personal existence to an illusion and a practical joke (CP 4.68), declaring that the individual person was a mere cell of a social organism, distinguished only by faults, limitations, and the aberration of a blind-will (CP 1.467; 1.673). The peculiar appearance and apparent alienation of the occupant of Peirce's maze conceivably reflects his antipathy towards this theme. To conclude, simplistically, we might end by opposing Uexküll's romantic conception of the living subject capable of spontaneous self-determination, to Peirce's postmodern conviction that it is in fact the exchange and elaboration of signs that shapes the cosmos. On the one hand, the precarious position of the ephemeral individual isolated within a beguiling sphere of sensation, on the other, the prospect of losing oneself forever within that labyrinthine network of signs in which our communal existence is entangled. There is, though, another way of linking the differentiation of the environment and the emergence of a self-conscious being.

Teleology and the symbolic differentiation of the self

As Hoffmeyer (2004) argues in his essay on Uexküll's concept of *Planmässigkeit*, rather than conceiving of nature's accordance with a plan such that a vital force or transcendent spirit must be deemed responsible for directing the activity of organisms, it is a revival of Aristotelian teleology which clarifies this conception of purposiveness within nature. In place of an efficient cause, as in the immediate and physical agent of change upon which positivistic science tends to be fixated, the Aristotelian notion of a final cause better describes the potential inscribed within the function cycles that make up an *umwelt*. Final causation does not explain events in

terms of a desire or compulsion for particular ends, rather it denotes a more general outcome that may be brought about in a variety of ways:

[F]inal causes, as Aristotle conceived them, are types of outcomes. As such they are potentialities, whether or not actualized, as for instance an acorn, whose ‘destination’ it is to grow into an oak, not into a birch or a salamander – but which, as is well known, most often doesn’t grow at all. (Hoffmeyer 2004: 76)

The potential for an acorn to become an oak does not just depend on the inner capacity of the germinating seed for organized growth, it also pertains to a whole host of other factors, and accidents, including the habits of other organisms within the same environment. In other words, the final cause of the acorn entails an entire ecology of different relations, and is, as Hoffmeyer (2004: 84) puts it, “irreducibly bound to the whole biosemiotics setting [...] a product of endless diversifications of holistic patterns”.

By associating the sequencing of functional cycles with the metaphor of a melody – an organized structure that exceeded the here and now of physics – Uexküll applied a version of teleological reasoning to the behaviour of living organisms (Stjernfelt 2001: 87–88). The teleological circle which connects the first note of a refrain to the intonation of the last involves a duration that is at once irreducible and articulate. Just as the performance of a melody may always be subject to slight variations, a functional cycle was not necessarily wholly opposed to indeterminacy, nor was the possibility of acquiring new habits irrevocably ruled out. From a teleological point of view the intimate bond between the organism and its environment, which seemed to stem from subjectivity, should not be seen as an isolated unit, but rather as the product of patterned relations *between* things. While abstracted from the context of their actual interactions, each coupled *umwelt* and organism would appear impervious to its counterparts, but reframed within the semiosphere, as the condition of their evolution, a more complete picture of the relationality of ecosemiotics becomes apparent.

If teleology begins to lead the way out of a restricted conception of Uexküll’s *umwelt* towards a more open interpretation of his ecology, then re-orientating the sense of agency within Peirce’s semiotics must involve a further consideration of the subjective self. Despite his persistent disdain for subjectivity, there is evidence that Peirce, particularly in his later writings, was concerned to appreciate the importance of the idea of the self for his philosophy. Vincent Colapietro (1989) has made a particularly strong case for the role of the self in Peirce’s work, arguing that although, initially, he saw the self solely as a sign in the process of development, Peirce eventually advanced this notion to include a vision of the person as an autonomous agent of reason. Peirce’s 1885 revision of his categories, which Murphey claims was

necessary to evade the risk of infinite regression, involved a move back towards a more Kantian conception of transcendental experience, helping to establish a decisive role for subjective selfhood (Murphey 1993: 303). Ivan Mladenov (2006: 107) suggests that Peirce's irritation with any direct discussion of subjectivity stemmed from his commitment to a more fluid, dynamic, and itinerant understanding of this concept, out of step with prevailing attitudes towards the identity of the human mind.

Just like the mind to which it served to lend specificity, the Peircean self was neither wholly individual, nor defined purely by consciousness. Yet, at the same time, the self personified an aspect of felt Firstness which was singularly ineffable, and which therefore could not be swallowed up entirely by its social relationships (Colapietro 1989: 74). In dialogue with both its own history and the community of which it was a member, the Peircean self could not be adequately defined by the self-interested motives of the ego (Colapietro 1989: 96). Poised in a process of interference between 'I' and the 'Other', the individual and the community, the subject could never fully coincide with itself; it depended on ignorance and error in order to distinguish its own existence (CP 5.235). Accordingly, to maintain integrity the self must retain a level of self-control, very much like the cybernetic guidance system established by Uexküll's functional cycle, consolidating not just a provisional private sphere, but the trajectory of a communicative agent (Colapietro 1989: 79).

In his anthropological study of the relations between the Runa people of Ecuador's Upper Amazon, and the forest in which they dwell, Eduardo Kohn (2013: 78) has expanded Peirce's notion of the self still further:

The semiotic quality of life – the fact that the forms that life takes are the product of how living selves represent the world around them – structures the tropical ecosystem. Although all life is semiotic, this semiotic quality is amplified and made more apparent in the tropical forest, with its unparalleled kind and quantities of living selves. [...]

The worlds that selves represent are not just made up of things. They are also, in large part, made up of other semiotic selves. For this reason I have come to refer to the web of living thoughts in and around the forests of Ávila as an ecology of selves.

As Kohn recognizes, and the Runa ably demonstrate, together with the community that nurtures its representation, the ecology of selves encompasses a myriad of non-human or more than human beings. This enhanced sense of the self, as a confluence of diverse representations, extends to include non-human creatures, as well as the forest as a whole, along with imaginary and mythological beings, such as the spirits of the dead, animal-human hybrids, and even racial abstractions. For Kohn (2013: 15), drawing on both Peirce and Uexküll's example, doing justice to the culture of this community entails charting the ways in which language is nested within broader

forms of representation, and accepting that signs cannot be fully circumscribed by the symbolic. While in the main accepting Kohn's point here, to conclude I will briefly return to Peirce's account of the symbol in order to highlight another aspect of this concept which is sometimes overlooked in its association with linguistic signs. Without the scope to develop this idea in full, my contention is that, as a cipher for the biological basis of selfhood, a re-examination of the symbol helps to qualify the attention to subjectivity which has long been the focus of cultural theory outside of anthropology.

Understood as selves, living organisms do not just access their surroundings via the interpretation of signs, if we consider their existence in terms of a frame they too begin to resemble living symbols. With respect to humans alone this notion translates into the familiar idea that our self-recognition consists of language, but when applied more generally to the corporeal development and genetic evolution of biological beings it leads to a more striking conclusion. As is well known a symbol is a special sort of sign in that its interpretant maintains its significance without direct reference to the object it is deemed to stand for. Unlike a sign indicating a direction or representing a quality, a symbol asserts its meaning via an act of self-reference, distinguishing not only the object which it denotes, but also the medium through which its identity is expressed. Along similar lines, Peirce asserted that between the logical *subject*, containing the whole or part of the index (i.e. an instance of reference), and the logical *predicate*, which incorporated the icon (i.e. a particular quality), the *symbol* acted as the *copula*, embodying the relation which at once distinguished and identified these two components of a proposition (Peirce 1998: 20).

Effectively, via the general rule determining its significance, an interpretant is already recursively embedded in the body of a symbol, and this potential for self-reference requires the introduction of yet another interpretant in order to be activated. Once again, along with Peirce's semiotics, Uexküll's functional cycle comes to mind, this time as a model for a situated teleology of self-discovery. In the case of linguistic symbols, a socially mediated convention at once guarantees the reference of a word and differentiates its identity, contrasting the character of this sign with other symbols of the same language. Yet, when the same logic is applied to an organism, it embodies a more complex series of acquired dispositions and habits, each of which maintains a life in contradistinction to the external setting on which its survival depends. From this perspective at least, an organism is a living symbol of the habitat it serves to frame. And, as a frame of nature, a habitat reciprocally differentiates both the individual organism and the *umwelt* which it inhabits.

Conceived then as a symbol, a living sign of the ecological dynamic which supports its existence, the human animal should be considered not merely as the author or arbitrator of signs, but as the product of an ongoing process of semiosis which complicates its instrumental ambitions. Crucially, as Kohn demonstrates, fully

appreciating this process depends upon escaping the provincial domain of language, and contending with the fact that the symbolic realm is entangled with various non-symbolic forms of meaning. Only in this sense, more or less at odds with a frame, can human beings continue to sincerely narrate their own evolution, thinking through a significance that at once clarifies and exceeds fixed relations. It is in a new critical confrontation with the hybrid body of the symbolic-self, as well as that texture of non-symbolic signs with which its existence is interwoven, that the humanities can start to face up to the challenge of a contemporary ecosemiotics. That is to begin reconstructing subjective agency on the threshold of an environment, without allowing this figure to either become trapped in a self-referential circle curtailing its aspirations, or to go missing in the labyrinth of its own relations.

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Круг и лабиринт – два образа экосемиотики

В статье сравниваются работы Якоба фон Юкскуля и Чарльза Пирса для рассмотрения двух противостоящих, но в то же время соотносимых образов экосемиотики. Целью является не просто противопоставление, но также исследование напряжения между ними, которое имеет последствия для этических аспектов формирующейся дисциплины – экосемиотики. Функциональный круг Юкскуля соотносится с образом круга, который хотя и подчеркивает интеграцию организма и окружающей среды, но в то же время приводит к солипсизму и чрезмерно детерминированному описанию экологических отношений. Рисунок лабиринта Пирса иллюстрирует эволюционную игру экосистем и может повлечь за собой такой уровень непредсказуемости, который катастрофически хаотичен. Источник этих весьма различных описаний связан с ролью субъективности в порождении семиотических отношений как в работах Юкскуля, так и Пирса. Если более регрессивные аспекты теоретической биологии Юкскуля смягчены телеологической интерпретацией каузальности, являющейся основой жизни, то ориентирующая агентность в работах Пирса зависит от внимания к идее «самости» (*self*) в его философии знаков. В заключении приводится концепция Эдуардо Кона об «экологии самости» (*ecology of selves*) и подтверждается статус организма как живого символа этой среды.

Ring ja labürint: ökosemiootika kaks kuvandit

Käesolevas artiklis kõrvutatakse Jakob von Uexkülli ja Charles S. Peirce'i tööd, et heita valgust kahele vastandlikule, ent teineteisega seostuvale ökosemiootika kuvandile. Eesmärgiks pole ainuüksi nende tööde vastandamine, vaid ka tähelepanu pööramine pingele, millel on tagajärgi selle kujuneva distsipliini eetilise mõtme osas. Uexkülli funktsiooniringi seostatakse ringi kujundiga, mille puhul, kuigi rõhutades organismi ja keskkonna lõimumist, näidatakse, et see põhjustab solipsismi ning ökoloogiliste suhete liigdeterministlikku kirjeldamist. Peirce'i joonistust labürindist vaadeldakse labürindi esindajana, millega, kuigi see näitlikustab ökosüsteemide evolutsioonilist mängu, võib kaasneda ennustamatus tase, mis osutub katastroofiliselt kaootiliseks. Nende lahknevate kirjelduste algallikat samastatakse subjektiivsuse rolliga semiootiliste suhete tekitamisel nii Uexkülli kui ka Peirce'i töödes. Kui Uexkülli teoreetilise bioloogia regressiivsemaid aspekte leevendab elu aluseks oleva kausaalsuse teleoloogiline tõlgendamine, sõltub Peirce'i tööde suunav agentsus tähelepanust ise idee tema märgifilosoofias. Kokkuvõttes osutatakse Eduardo Kohni 'Isede ökoloogia' kontseptsioonile ning kinnitust leiab organismi staatus selle keskkonna elava sümbolina.