

How to make worlds with signs. Some remarks on Jakob von Uexküll's Umwelt theory

Carlo Brentari

University of Trento, University of Verona
carlo.brentari@unitn.it

Abstract This article addresses the conception of the environment (Umwelt) of the Estonian physiologist and biologist Jakob von Uexküll (1864-1944). Uexküll's core idea is that the Umwelt of animals and humans is a species-specific subjective construction. Two basic dynamics co-operate in this process: the first is a transcendental elaboration of the stimuli from outside reality, which creates potential signs ready to be used for the animal's behavioural needs; the second is the re-assignment (*Hinausverlegung*) of these signs to the outside world. Uexküll's theory about the construction of the Umwelt can only be understood by acknowledging both aspects (the transcendental and the semiotic) and keeping them together. A criticism could therefore be made of those interpretations of Uexküll's thought that view the species-specific Umwelt as the product of a passive perception process. Finally, two critical points in Uexküll's theory will be focused on: the risk of "species-specific solipsism" and an inadequate consideration of two peculiarities of the human semiotic environment (its high intra-specific variability and its inclusiveness towards other species' Umwelten).

Keywords: species-specific Umwelt, transcendental subject, endosemiotics, ethology, biosemiotics

1. Introduction

The Estonian physiologist and biologist Jakob von Uexküll (1864-1944) is mainly known for his reflections on the notion of Umwelt; according to Uexküll, the Umwelt is the subjective environment of animals, the sphere of their perception and action as it emerges from their species-specific traits (including their anatomic, physiologic and behavioural features). The present paper has two main aims. Firstly, it is intended to highlight the fact that Uexküll's conception of the Umwelt has two major philosophical sources; i.e. a transcendental and a semiotic one. This requires an analytical reconstruction of the two different phases of Uexküll's thought: a first "endosemiotic" phase, whereby the construction of the Umwelt is mainly seen as being based upon physiological processes, and a second, "exosemiotic" one, which is more directly centred on the role of signs and meanings in animal behaviour.

Secondly, the main line of interpretation of Uexküll's work can be criticised. This is a line that starts with XXth Century German philosophical anthropology (Max Scheler, Arnold Gehlen) and includes Martin Heidegger. It is an interpretation line

that is based on the idea, misleadingly ascribed to Uexküll, that the construction of animals' Umwelten is a rather passive and selective perception process, whereby the transcendental and semiotic sides of animals' cognitive functions remain neglected. Considered together, these two steps can allow us to gain a better understanding of Uexküll's view of the organism as an active and spontaneous subject and to obtain a full view of his vision of the animal realm as being made up of a series of subject-centred Umwelten.

2. Uexküll's early essays: a physiological way to meaning

The idea of a subjective environment traces back to Uexküll's early reading of Kant's *Critique of Judgement*. Thus following Kant, Uexküll regards the building of the subjective Umwelt in animals as a process of transcendental construction, functionally analogous to that which occurs in humans. The Kantian roots of Uexküll's *Umweltlehre* are particularly clear in the "Introduction" to *Theoretical Biology*:

When we admit that objects are appearances that owe their construction to a subject, we tread on firm and ancient ground, especially prepared by Kant to bear the edifice of the whole of natural science. [...] The task of biology consists in expanding in two directions the results of Kant's investigation: 1) by considering the part played by our body, and especially by our sense organs and central nervous system, and 2) by studying the relations of other subjects (animals) to objects (UEXKÜLL 1926: xv).

This double attempt to give a physiologic foundation to Kant's transcendental approach and to extend it to the study of animal behaviour revealed itself to be an exceptionally fertile stance and led to widely known works such as *Theoretical Biology* (UEXKÜLL 1926) and *A Foray into the Worlds of Animals and Humans* (UEXKÜLL 2010a).

Besides the Kantian transcendental approach, there is another theoretical framework that must be taken into account in order to understand Uexküll's conception of the animal and its Umwelt: the view of perception and subjective experience as semiotic processes. With regard to the latter, it is more problematic to find a single theoretical reference point than in the previous case, where Kant played a decisive role; one must certainly mention the physiologists Johannes Müller (1801-1858) and Hermann von Helmholtz (1821-1894), who both stressed the radical difference between the excitation circulating in the sensory and nervous apparatus and the external reality the latter originates from. However their influence, although relevant, is not sufficient to explain the importance that the semiotic approach assumes, especially in the last period of Uexküll's theoretical biology. Indeed, the semiotic side is one of the most original features of Uexküll's thought, and so is the combination of the transcendental construction of the Umwelt and the idea that this construction is based on signs. The conception of the animal as a transcendental subject is integrated with the basic intuition that this subject's way of operating is semiotic. In other words, the transcendental construction of the Umwelt is concretely based on processes of creation and interpretation of signs.

Section two and three of the present paper focus on three main issues, all of them related to the semiotic side of Uexküll's *Umweltlehre*. The first issue points out the presence of a theory of physiological semiosis, or *endosemiosis*, already in the first

period of Uexküll's scientific production, particularly in the first edition of *Umwelt und Innenwelt der Tiere* (UEXKÜLL 1909). The second issue delineates Uexküll's theory of the transcendental construction of the Umwelt as it emerges from *Theoretical Biology, A Foray into the Words of Animals and Humans* and *A Theory of Meaning* (UEXKÜLL 2010b). As we will see, in these mature works the endosemiotic approach is gradually replaced by an exosemiotic one (for the terms endosemiosis and exosemiosis, see UEXKÜLL, GEIGGES, HERMANN 1993: 33). The third issue of our analysis shows that the understanding of the diverse semiotic elements of Uexküll's theoretical biology also leads to a deeper insight into the originality of his conception of the transcendental subject. Then, if it is true that the notion of the transcendental subject does not logically imply the semiotic character of the subject itself, one must also recognize that Uexküll's core idea that every (animal and human) subject is constantly involved in processes of creation, assignment and reading of signs fully meets the aim of Kant, acknowledging the spontaneous activity of the subject and its legislative power on the experience of the world.

The first clear indications of a semiotic approach to animal perception and experience can be found in UEXKÜLL 1909. In the previous works, the relationship between sense organs and animal experience was more traditionally thought of as a selection (*Auswahl*) of the stimuli from the outside world, followed by the correct processing of all information about light, temperature etc. carried by the stimuli themselves (see in particular UEXKÜLL 1905: 13, 17). Even in UEXKÜLL 1909, the starting point remains the conception that the function of sense organs (and of the corresponding parts of the nervous system) is «to transform the stimuli from the outside world in excitation» (UEXKÜLL 1909: 192); however, this statement is followed by the resolute negation of any resemblance between the stimulus (and the outside world behind it) and the resulting perception:

So in the nervous system the stimulus itself does not really appear but its place is taken by an entirely different process which has nothing to do with events in the outside world. This process can only serve as a *sign* which indicates that in the environment [Umwelt] there is a stimulus which has hit the receptor, but it does not give any evidence of the quality of the stimulus. The stimuli of the outside world are altogether translated into a nervous sign language (UEXKÜLL 1909: 192; English translation from UEXKÜLL T., GEIGGES, HERMANN 1996: 33).

In this quote, Uexküll does not differentiate between the notion of the outside world (*Außenwelt*) and that of *Umwelt* as precisely as in his later works, where the Umwelt is the final result of the perceptual and transcendental activity of the subject, and the outside world is the rough material for this activity. Despite this confusion, in the last statement («the stimuli from the outside world are altogether translated into a nervous sign language») we can easily recognize the presence of a semiotic approach to animal perception¹.

In order to properly understand the implications of Uexküll's approach, we need to make some observations. First of all, the stimuli from the outside world do not carry any information; they do not say anything about the objects, qualities and processes of what we call "reality". The semiotic function of the stimuli is also affected by a

¹ The importance of this passage has been stressed by many interpreters; see FAVAREU 2009: 307; UEXKÜLL T., GEIGGES, HERMANN 1996: 33.

severe limit: the correctness of the denotation is not verifiable by the subject. In other words, the subject has no independent means for verifying the content correspondence between signs and objects. A more radical formulation of this conception is the idea that even the broad classification of the stimuli into visual, acoustic, olfactory, tactile percepts conveys no information about the outside world and rests only on the physiology of the subject. If we, as external observers, consider an animal's behaviour, its preciseness and its regularity, we see that the animal is able to differentiate among the objects it meets; at the physiological level, an operative differentiation among the signs must therefore be present and, if we exclude that signs are different depending on the objects they stand for, this differentiation must follow other ways.

In his early works, Uexküll offers a physiological answer (or rather a set of answers) to the question of the differentiation of the percepts; as we will see, this set of answers leaves open many problems and will be changed later. The stimuli, argues Uexküll, are differentiated on the basis of the neural paths they go through from the nerve endings to the brain. In animals, and specially in superior animals, «each sensory organ disposes upon a great number of centripetal paths and is therefore able to distinguish even the smallest differences among the stimuli [...] by using a different nerve path for each kind of stimulus» (UEXKÜLL 1909: 192). This differentiation process is not the only one. In inferior animals, the stimuli are mostly differentiated according to their threshold value: different intensity values, although quantitative, are treated by the organism as qualitative marks and allow it to react adaptively. In superior animals, both strategies are present and integrate each other in a highly efficient manner, even if the differentiation through separated pathways is prevailing.

According to Uexküll, in superior animals there is always a third way to differentiate the homogeneous nervous stimuli without any direct reference to outside objects: the spatial disposition of the nerve fibres activated by a particular sequence of stimuli. This strategy is implemented by the nervous system in order to “render” the spatial relationship among those points of the outside world from which the stimuli originate (whereby naturally only an external observer can be aware of that; to the organism itself, a direct access to the outside world remains impossible). The result of the activation of these structures (which must be thought of as physical entities, not as cognitive faculties) is an inner physiological landscape that Uexküll calls «counterworld» (*Gegenwelt*, see UEXKÜLL 1909: 191), «mirror world» (*Spiegelwelt*, see UEXKÜLL 1909: 195) or occasionally «nerve mirror» (*Nervenspiegel*, see UEXKÜLL 1910: 43). At first sight, there seems to be a contradiction regarding the three strategies used by the nervous system and by the brain in order to differentiate the “neutral” stimuli of the outside world: in the first two – i.e. in the use of threshold values and of different neural pathways – no similarity is given between the stimulus and the external entity it stands for; in the third, the notion of a physiological mirror world seems to imply a mimetic relationship between the “nervous sign language” and the outside world. A further passage of the text, however, reveals the semiotic nature of the mirroring process: «Which way we should think the disposition of the neural fibres, if to a circle in the outside world correspond a circular rather than a triangular disposition of the neural pathways, all this is totally indifferent» (UEXKÜLL 1909: 194). And, if a triangular shape can represent a circular object of the outside world, then we must conclude that the first is a sign of the second. In other terms, the sequence of stimuli from the outside world activates a *Gestalt*, which is treated by the animal subject as a semiotic

element: it becomes an element of the subjective Umwelt, a significant part of its conscious experience. And even if the animal has no way to check the correspondence between the inner *Gestalt* and the outside world, the resulting behaviour is purposeful and highly efficient.

In UEXKÜLL 1909, and in general in the works of the 10s, the emerging semiotic approach coexists with the need to identify with scientific precision the subject of semiosis (the nervous system as a whole) and the different strategies it applies (the threshold values of the stimuli, the different neural pathways from the receptors to the brain and, finally, the spatial disposition of the nervous and neural fibres). Uexküll's basic intuition of a meaningful Umwelt resulting from the semiotic activity of the subject is held within the boundaries of a physiological research approach. An observation from UEXKÜLL T., GEIGGES, HERMANN 1996 can help us to understand the peculiar relationship between physiology and theory of the Umwelt which characterizes this phase of Uexküll's work:

In order to understand the nervous system as an organ in a semiotic anatomy of the body we have to realize its function for an "inner world". Its sign processes as a whole are an endosemiotic mirror, so to speak, of the exosemiotic *Umwelt* or subjective universe (UEXKÜLL T., GEIGGES, HERMANN 1996: 33).

3. Uexküll's ethology of meaning

The idea that the animals' relationship to the outside world is mediated by the physiological production of inner signs, which are then used by the subject for the transcendental construction of the Umwelt, is a steady element in Uexküll's works. What changes with the years is that Uexküll gradually focuses his attention on a different phase of the process: if in UEXKÜLL 1909 the Estonian biologist is mainly interested in the endosemiotic strategies by which the nervous system composes the basic elements of the nerve language (its lexicon, so to speak), in UEXKÜLL 1926, UEXKÜLL 2010a and UEXKÜLL 2010b he concentrates chiefly on the exosemiotic part (on the performative side of the nerve language itself). In other words, rather than in the physiological processes by which the stimuli are translated into signs, in the 20s and 30s Uexküll is more interested in the way those signs are used in the constitution of a meaningful Umwelt. This turn should not be understood as a radical one; both the endosemiotic and the exosemiotic perspectives coexist in varying proportions in Uexküll's work as a whole. If we consider the "Introduction" to UEXKÜLL 1926, we can see that its starting point is Helmholtz' conception that sense-qualities are «signs of an external phenomenon which proceeds parallel with their change», or better «subjective signs of the actual phenomenon» which «remains forever unknown to us» (UEXKÜLL 1926: XIV). The causal relationship between the external phenomenon and the sense-quality is taken as a basic fact of physiology, and in the following pages, Uexküll's attention shifts to the ways in which the subject uses the sense-qualities in order to build its Umwelt.

In this connection we should not forget that this process is a transcendental one. According to Uexküll, sense-qualities are possible only on the basis of determinate transcendental forms which are more particular and content-related than the Kantian intuitions of space and time. These concrete forms of perceptual experience are classified by the Estonian biologist in several groups of "signs": local signs, direction signs, moment signs and effect signs. One of the clearest examples among them is that of the direction signs, i.e. of the sense-qualities «back and forth, up and down,

left and right» (UEXKÜLL 1926: 7). All these categories of signs are independent from experience; indeed, as we know, the external phenomenon remains unknown, so that we cannot derive anything from it. Sense-qualities arise from our physiological inner world (and in UEXKÜLL 1926 it is no more fundamental to say *how* they arise) and are then used to construct the subjective world of the Umwelt, a world that is experienced as objective and fully “real”. This final stage, which Uexküll calls *Hinausverlegung* («outside transposition» of the sense-qualities with significant function; see UEXKÜLL 1926: 77), is fully unconscious and explains why we spontaneously consider the above mentioned distinctions (back and forth, etc.) as features of the external world and not as products of our own mental activity (on the key issue of the *Hinausverlegung* of inner generated signs, see also UEXKÜLL 1930: 105, 127 and UEXKÜLL 2010b: 165).

In order to better understand this idea of a biosemiotic *and* transcendental construction of the Umwelt we must mention two further elements. Firstly, the sense-qualities are at the same time formal and concrete in terms of content: concrete because they are specific and unmistakable (who could say that “left”, as a content of experience, is the same as “right”?), and formal because they are ready to receive other perceptual signs such as sounds or colours (which then will appear as temporally and spatially determined in the resulting experience). Uexküll labels contents of this kind, which interplay with the first and more formal ones as their material, “content qualities” (*Inhaltsqualitäten*, UEXKÜLL 1926: 70). Secondly, the sense-qualities are species-specific: each biological species has its own repertoire of signs, which can differ from those of other species, even in radical ways. For instance, there can be elementary organisms which do not use moment signs to construct their Umwelt and therefore live in an eternal present, others which lack one or more direction signs, still others which cannot unify different qualities in a single object, and so on. Presently, we cannot discuss in deeper detail the peculiar, still physiologically based phenomenology of perception that Uexküll displays in UEXKÜLL 1926 (for further information, see BRENTARI 2011: 125-137); for the scope of this paper it will be enough to say that each category of signs interacts with the others under the central control of the nervous system, and that the result of this process is the building of an Umwelt which, although subjective, is experienced as absolutely objective and real.

In UEXKÜLL 2010a and UEXKÜLL 2010b, the Estonian biologist’s turn to focus on prevailing exosemiotic interests is confirmed; both works are concerned with the transcendental constitution of the Umwelten of animal and humans without going into the details of its physiological basis (in particular, Uexküll does not mention any of the mirroring strategies described in UEXKÜLL 1909). In one of the rare physiological remarks contained in UEXKÜLL 2010a, the biologist limits himself to say that

the organism uses brain cells [...] grouping half of them in differently-sized groups of “perception cells” [...]. These groups correspond to external groups of stimuli, which present themselves to the animal subject in the form of questions. The organism uses the other half of the brain cells as “effect cells” or impulse cells [...], which impart the animal subject’s answers to the outside world (UEXKÜLL 2010a: 47).

How that occurs and what exactly happens between the receipt of a stimulus and the response of the effector organ remains largely unrecognized in UEXKÜLL 2010a. If

we take the famous example of the tick, we see that Uexküll calls both the animal's physiological structure and the object towards which its behaviour is directed (i.e., the mammals which serve as hosts for the tick) «counterstructure» (*Gegenstruktur*, UEXKÜLL 2010a: 49), a term which generically indicates the unknowable ultimate substrate of perception and/or active behaviour (see also UEXKÜLL 2010b: 146: «the greatest part of the body of a carrier of meaning only serves as an undifferentiated counterstructure, which is only there in order to hook up the perception sign-carrying parts with the effect sign-carrying ones»). In the previous works, the term was mostly used to refer to the inaccessible external source of the physiological stimuli (Kant's *Ding an sich*), while on the subject's side, the physiological research seemed to leave open the way for a deeper understanding of the substrate (i.e. of the body in itself, of the inner world of physiology).

Besides the gradual vanishing of the endosemiotic interests and the correspondent rise of the exosemiotic approach, one of the most important and innovative aspects of UEXKÜLL 2010a and UEXKÜLL 2010b is that the biologist's attention focuses not only on the elementary traits of the Umwelt (space, time, content qualities, presence of unified objects etc.) but also on the possibility, for superior animal and humans, to give further meaning to the simple Umwelten of perception. Even such forms of higher Umwelt-elaboration are species-specific and rest on the transcendental activity of the subject. Some clear examples can be found in the last part of UEXKÜLL 2010a, where Uexküll describes and explains some topics of animal and human ethology such as territoriality, companionship, imprinting, search behaviours and other complex behaviours. All these topics are based on the assignment of a secondary meaning to one or more perception elements of the species-specific Umwelt; in these cases, the animal subject – and, more and more frequently in UEXKÜLL 2010a and UEXKÜLL 2010b, even the human one – operates at a higher transcendental level, whereby the perceptual and operative Umwelt, already constituted through the above described process of *Hinausverlegung* of sense-qualities and content qualities, becomes the material for further interpretation. In this process, the basic perception elements of the environment remain unchanged, but these elements take on a new «tone» (UEXKÜLL 2010a: 93) or «become carriers of meaning» (UEXKÜLL 2010b: 140).

In order to get a better insight into these forms of higher elaboration of the perceptual Umwelt, it helps to examine in deeper detail two case studies proposed by Uexküll. The first case study comes from the ethology of the hermit crab (*Pagurus bernhardus*). The species-specific Umwelt of the hermit crab is a simple one, made as it is of very few salient properties and objects. However, even in this elementary environment an advanced process takes place: the shift of function (or rather, the shift of meaning) of a particular object, a sea anemone (*Anemonia sulcata*). According to the circumstances, the behavioural repertoire of the hermit crab includes three different ways to relate to a sea anemone: if the anemones that it carried before as a defence against predators have been removed from its sea-snail, the hermit crab will use a new anemone as a substitute for the lost ones, sticking it on the top of its sea-snail; if, besides the anemones, even the sea-snail has been taken away, the hermit crab tries (without success) to crawl into the new anemone; finally, if a crab carrying both sea-snail and sea anemones is left without food for a certain time, it will feed on the new anemones it meets. According to Uexküll, in each of the three situations the hermit crab is in a different «mood» (*Stimmung*) and experiences a different connotation, or emotional colouring, of the «perception image» (UEXKÜLL 2010a: 93) of the sea anemone:

In the first case [...] the perception image of the sea anemone had a “protecting tone” [...]. If the same crab is deprived of its shell, the perception image of the sea anemone takes on a “dwelling tone” [...]. In the third case, that of the starving crab, the sea anemone takes on a “feeding tone” [...]. These experiences are so valuable because they show, already in the environment of the arthropods, that the perception image provided by the sensory organs can be completed and altered by an “effect image”, which is dependent on the next action that takes place (UEXKÜLL 2010a: 93).

A second case of higher transcendental elaboration of the perceptual Umwelt is the particularly puzzling behaviour of the starling (*Sturnus vulgaris*) catching an imaginary fly, a phenomenon which Uexküll knows from a communication by Konrad Lorenz:

A researcher who is a friend of mine [Lorenz] [...] had raised a young starling in a room, and the bird had no opportunity ever to see a fly, much less to catch one. Then he observed that the bird suddenly started after an unseen object, snapped it in the midair, brought it back to its perch and began to hack away from it with its beak, as all starlings do with the flies they catch, and then swallowed the unseen thing. There was no doubt as to the fact that the starling had had the appearance of an imaginary fly in its environment. His whole environment was evidently so laden with the “feeding tone” that, even without the appearance of a sensory stimulus, the effect image of flycatching, poised to spring, forced the appearance of the perception image, which triggered this whole sequence of actions (UEXKÜLL 2010a: 93).

Uexküll explains this peculiar behaviour of the starling through the temporary formation of a so-called «magical environment» (UEXKÜLL 2010a: 119). As in the previous case, the already determinate perceptual Umwelt is open to further elaboration, and specifically to the “forced” addition of one or more elements which – although non-perceptual in so far as not inducted by any outside stimulus – are experienced by the subject as fully real. In this regard, it is useful to compare Lorenz’s explanation to the bird’s behaviour: Lorenz considers it as an example of the so-called *vacuum* activity, whereby *vacuum* (German: «auf Leerlauf»; see LORENZ 1981: 127) means “independent from outside stimulation”. In other terms, Lorenz explains the phenomenon through the increasing pressure of a drive, in this case the hunting drive, which has not been satisfied for a long time, so that the animal is ready to react to weak stimuli, substitute objects or even no objects at all. However, in so far as the subjective experience of the animal is concerned, Lorenz is more careful than Uexküll: if the second believes that the animal subject actually sees the triggering stimulus (i.e. the fly), the Austrian ethologist limits himself to the following statement:

When observing such behavior, one is immediately conscious of the question as to what subjective phenomena are experienced by the animal, since this behavior is so reminiscent of that of certain human psychopaths who experience hallucinations (LORENZ 1970: 93).

Uexküll, according to which the whole behaviour of the animal rests on the transcendental construction of the Umwelt, is firmly convinced of the subjective reality of the “magical” element triggering the starling’s behaviour.

An analogous difference between Uexküll and Lorenz can be found in their approach to the phenomenon of imprinting in social birds: while Lorenz underlines the strength and the positive character of the instinctive bond between the young bird and the maternal figure (even if the latter is a human being), Uexküll sees this kind of behaviour – which he defines as «imprinting meaning» (UEXKÜLL 2010b: 176) on perceptual elements of the Umwelt – as «a matter of confusing perception images» (UEXKÜLL 2010a: 108). In other words, there is a misleading interference between perception image and effect image (UEXKÜLL 2010a: 113), which can have negative consequences for the bird's fitness (as an adult, a bird which was imprinted on humans could not be able to assign the meaning of “sexual partner” to the right element of its perceived Umwelt)². For the scope of the present paper, however, it must be pointed out that according to Uexküll, every (effective or misleading) interaction between perception images and effect images and every assignment of “tone” or meaning to perceptual elements is possible thanks to the common transcendental character of every component of the Umwelt.

4. Uexküll's *Umweltlehre* in the interpretation by the German philosophical anthropology of the XXth Century

In the second half of the XXth Century, Uexküll's theories and terms were drawn up by many scholars, both philosophers and scientists (for an analytical review of the influences of Uexküll on the subsequent philosophy and human sciences, see BRENTARI 2011: 223-302). If we consider in particular the different interpretations given to Uexküll's *Umweltlehre*, we can see that a chief hermeneutic line has overcome the others, i.e. the line which can be traced back to Scheler and to the philosophical anthropology of the XXth Century (as well as Scheler, Helmuth Plessner, Arnold Gehlen and, regarding the interpretation of the Uexküllian notion of Umwelt, even Ernst Cassirer, Susanne Langer and Martin Heidegger)³. According to this hermeneutic line, the constitution of a species-specific Umwelt is a selective process rigidly determined by the anatomical and physiological structure of the animal; in other words, from this perspective, an Uexküllian Umwelt seems to be that part of the objective world to which the animal has access thanks to its sensory organs, and which it reproduces in its cognitive sphere. In this way the construction of the Umwelt becomes a rather passive perception process, and the species-specific character of the environment risks being reduced to a subordinate effect of the animals' sensory-motor functions.

This conception is functional to the XXth Century philosophical anthropology's aim to keep alive a qualitative difference between humans and other animals (even if in a more naturalistic way than in previous metaphysics and theology): only humans are open to a significant world (*Welt*) made of language, signs, symbolic forms, abstract knowledge, cultural traditions and so on, while animals are closed in their environment (*Umwelt*) and limit themselves to reacting to those stimuli and objects which pass through the filter of their receptor organs. In the case of Heidegger, this distinction even acquires an ontological meaning: our openness to the world makes

² For further information about the relationship between Konrad Lorenz and Jakob von Uexküll, see LORENZ 1948; MILDENBERGER 2005; BRENTARI 2009; BRENTARI 2011: 284-294.

³ See SCHELER 1973: 139, 155-156; SCHELER 1993: 395-397; PLESSNER 1975: 67-69, 247-251; GEHLEN 1993: 65, 70-71, 119; CASSIRER 1969: 43-44, 64; CASSIRER 1996: 199-200, 205; CASSIRER 2006: 28-30; LANGER 1967: 282-283; LANGER 1972: 45, 55, 132; HEIDEGGER 1995: 192, 198, 247-270.

«*only we [men] capable of experiences and having manifest [something] as being*» (HEIDEGGER 1995: 269; italics by Heidegger), while the animal, confined as it is in its Umwelt, dwells in a condition of «captivation», just waiting for the outside stimuli to disinhibit its driven behaviours (see HEIDEGGER 1995: 247-248; for a criticism of Heidegger's interpretation of Uexküll's notion of Umwelt, see BRENTARI 2011: 256-265).

In the present paper, we cannot discuss in detail the results, which are frequently excellent as man is concerned, that have been obtained by the above mentioned authors; what we want to stress, though, are the limits to their interpretation of Uexküll's theory. The main criticism is that they have underestimated, if not completely neglected, two chief implications of the Kantian heritage in Uexküll's thought. Firstly, if the research on the Umwelt has to be conducted according to the approach developed by Kant in order to explain the human world of experience, then the animal subject should be considered as endowed with the same degree of activity and spontaneity as the human subject. Secondly, the Kantian frame implies the unknowability of the outside reality considered in itself. Thus, if the source of the external stimuli is unknowable, then it is difficult to maintain that the subjective environment of animals is made of a species-specific selection of features of the objective reality; the idea of perceptual selection, indeed, presupposes a direct access to the reality the subject selects from. Consequently, both in humans and in animals, the Umwelt has to be acknowledged as a free production of the subject – or rather as a production determined only from inside, i.e. from the spontaneous organization of the subject.

Besides having neglected the Kantian heritage in Uexküll, the thinkers belonging to the philosophical anthropology of the XXth Century have almost universally missed a central issue: that the transcendental construction of the Umwelt is a semiotic process. In both periods of Uexküll's scientific work, which we have distinguished according to the prevalence of endosemiotic or exosemiotic interests, the stimuli coming from the outside reality are translated into signs by the nervous system, then the physiologically produced signs are transposed outwards and, finally, they are experienced as objective qualities of the world. This conception is fully consistent with the above mentioned gap between the transcendental subject and outside reality. Better still, one can state that such a gap *consists* in the translation of the stimuli into signs.

5. Conclusion

Many observations could be made in order to understand the full degree of Uexküll's conception, but we shall limit ourselves to the two issues which more directly emerge from the hermeneutic approach proposed in this paper – an approach that, it is now clear, aims at correcting the interpretation line that was started by the philosophical anthropology and is still alive in contemporary Uexküllian research (with the very relevant exception of the biosemiotic interpretations of Uexküll's thought⁴).

The first observation is that, due to the above mentioned gap between subject and

⁴ For the semiotic and biosemiotic interpretations of Uexküll's thought, and the results they have led to in contemporary authors, see BARBIERI 2008; BARBIERI 2009; DEELY 1990; FAVAREU 2008; FAVAREU 2009; HOFFMEJER 2004; KULL 2001; SEBEOK 1979; SEBEOK 2003; UEXKÜLL T. 1987.

reality, we have to do with peculiar kinds of signs, whose correspondence to the objects they stand for is not verifiable by the subject. This is a very problematic issue in Uexküll's theory. As Lorenz already noticed in 1948, this stance risks closing the subject in a solipsistic isolation, "a kind of monadology" (LORENZ 1948: 1); in this regard, contemporary scholars such as David Savan and Thomas Sebeok speak of «semiotic idealism» (see SAVAN 1983: 1; SEBEOK 2003: 80). The risk is real and has to be seriously taken in account, but there is a way to escape it. If we no longer believe any more in the existence of teleological factors harmonizing the different Umwelten, as Uexküll did, we can nonetheless maintain the positive theoretical acquisitions of his *Umweltlehre* by thinking of evolution as a unique process which embraces and connects all life-forms and all their expressions, even in subjective environments (BRENTARI 2009: 646).

On the other hand – and we come to the second observation – the gap between stimulus and sign can be seen as a separation line between the rough nature of stimuli and the more elaborate sphere of the subject-produced signs. It is maybe an exaggeration to consider this gap as functionally equivalent to the «Hiatus» that, in Gehlen's philosophical anthropology, establishes the possibility of man's symbolic and cultural life (see GEHLEN 1993: 55-57). Nevertheless, according to Uexküll, the physiologically rooted translation process is – both in humans and in animals – the necessary condition for the acquisition of meaning by the Umwelt. This theoretical perspective was clearly seen by Merleau-Ponty who, commenting on the aforementioned case study of the hermit crab, described the change of meaning in the crab's Umwelt as follows:

The crab uses the same object (the sea anemone) to different ends: sometimes for camouflaging its shell and protecting itself thus against fish, sometimes for feeding itself, sometimes, if we take away its shell, for replacing it. In other words, there is a beginning of culture. The architecture of symbols that the animal brings from its side thus defines within Nature a species of preculture (MERLEAU-PONTY 2003: 176).

This gradualist attitude is supported by many passages of Uexküll's work, especially in the final part of UEXKÜLL 2010a and in UEXKÜLL 2010b, where the examples chosen by Uexküll in order to explain his thesis (and in particular those about the higher elaboration of the Umwelt) are almost indifferently taken from animal and human behaviour. However, rather than the continuity between non-human animals and man, Uexküll aims to highlight the continuity between simple and complex environments; from this perspective, the human world appears to be one of the most complex species-specific Umwelten, but the semiotic processes through which it is constructed are basically the same as those leading to the higher animal's environments.

Not everything is convincing in Uexküll's gradualist stance. To mention only one problematic issue, a feature emerges in human environments: the intra-specific variability, which is rarely found in the Umwelten of non-human animals. Let us consider the famous Uexküllian example of the oak tree being interpreted in different ways according to the species-specific Umwelt it belongs to (UEXKÜLL 2010a: 126-132). While each of the animal species mentioned by Uexküll (the squirrel, the fox, the owl) gives only a single meaning to the oak (which takes on a protection tone for the fox and the owl and a climbing tone for the squirrel), two members of the human species can give it extremely different meanings: a rationally minded old

forester considers the tree «no more than a few cords of wood», while a young girl, whose forest is still a magical world filled with gnomes and spirits, sees in its rough bark the terrible face of a demon (UEXKÜLL 2010a: 128). Uexküll seems to believe that this kind of intra-specific diversity is no different from the inter-specific meaning variety displayed by the oak in the Umwelten of the above mentioned animal; this is a rather questionable point which is strictly connected to his neglect of the questions posed by the emerging of verbal language in man⁵.

Bibliography

BARBIERI, Marcello (Ed.) (2008), *The Codes of Life. The Rules of Macroevolution*, New York, Springer.

BARBIERI, Marcello (2009), «A Short History of Biosemiotics», in *Biosemiotics*, n. 2, pp. 221-224.

BRENTARI, Carlo (2009), «Konrad Lorenz's Epistemological Criticism towards Jakob von Uexküll», in *Sign Systems Studies* n. 37(3/4), pp. 638-661.

BRENTARI, Carlo (2011), *Jakob von Uexküll. Alle origini dell'antropologia filosofica*, Morcelliana, Brescia.

CASSIRER, Ernst (1969), *The Problem of Knowledge. Philosophy, Science, and History Since Hegel*, Yale University Press, New Haven - London.

CASSIRER, Ernst (1996), *The Problem of the Symbol as the Fundamental Problem of Philosophical Anthropology*, in CASSIRER, Ernst, *The Philosophy of Symbolic Forms. Volume 4. The Metaphysics of Symbolic Forms*, Yale University Press, New Haven - London, pp. 34-111.

CASSIRER, Ernst (2006), *An Essay on Man. An Introduction to a Philosophy of Human Culture*, , Felix Meiner, Hamburg.

DEELY, John (1990), *Basics on Semiotics*, Indiana University Press, Bloomington.

FAVAREAU, Donald (2008), «The biosemiotic turn», in *Biosemiotics*, n. 1, pp. 5-23.

FAVAREAU, Donald (Ed.) (2009), *Essential Readings in Biosemiotics*, Springer, New York.

GEHLEN, Arnold (1993), *Gesamtausgabe. Bd. 3, Der Mensch. Seine Natur und*

⁵ A similar criticism can be made by stressing that, as far as we know, humans are the only animals that show a theoretical interest in other species' Umwelten; a fact that Uexküll knew, but to which he does not give adequate weight. For a discussion of both points, see BRENTARI 2011: 188-195.

seine Stellung in der Welt, Vittorio Klostermann, Frankfurt am Main.

HEIDEGGER, Martin (1995), *The Fundamental Concepts of Metaphysics. World, Finitude, Solitude*, Indiana University Press, Bloomington and Indianapolis.

HOFFMEJER, Jespers (2004), «Uexküllian Planmässigkeit», in *Sign Systems Studies*, n. 32(2), pp. 73-97.

KULL, Kalevi (Ed.) (2001), *Jakob von Uexküll: A Paradigm for Biology and Semiotics*, Mouton de Gruyter, Berlin - New York.

LANGER, Susanne (1967), *Mind: An Essay on Human Feeling*, Vol. 1, Johns Hopkins University Press, Baltimore.

LANGER, Susanne (1972), *Mind: An Essay on Human Feeling*, Vol. 2, Johns Hopkins University Press, Baltimore.

LORENZ, Konrad (1948), *Referat über J. v. Üxküll*. Unpublished transcription by Hilde Fürnsinn of a seminary by K. Lorenz, conserved in the Lorenz-Archive of the KLI Institute for Evolution and Cognition Research of Altenberg, Austria.

LORENZ, Konrad (1970), *Studies in Animal and Human Behavior*, Vol. 1, Methuen & CO, London.

LORENZ, Konrad (1981), *The Foundations of Ethology*, Springer, New York - Wien.

MERLEAU-PONTY, Maurice (2003), *Nature. Course Notes from the Collège de France*, Northwestern University Press, Evanston.

MILDENBERGER, Florian (2005), «Worthy Heir or Treacherous Patricide? Konrad Lorenz and Jakob v. Uexküll», in *Rivista di Biologia*, n. 98, pp. 414-434.

PLESSNER, Helmuth (1975), *Die Stufen des Organischen und der Mensch*, de Gruyter, Berlin - New York.

SAVAN, David (1983), «Toward a Refutation of Semiotic Idealism», in *Recherches sémiotiques/Semiotic Inquiry*, n. 3, pp. 1-8.

SCHELER, Max (1973), *Formalism in Ethics and Non-Formal Ethics of Values*, Northwestern University Press, Evanston.

SCHELER, Max (1993), *Jakob Baron von Uexküll: Bausteine zu einer biologischen Weltanschauung*, in SCHELER, Max, *Gesammelte Werke*, Bd. XIV, Bouvier, Bonn, pp. 395-397.

SEBEOK, Thomas (1979), *The Sign & Its Masters*, University of Texas Press, Austin.

SEBEOK, Thomas (2003), *Segni. Introduzione alla semiotica*, Carocci, Roma.

UEXKÜLL, Jakob von (1905), *Leitfaden in das Studium der experimentellen Biologie der Wassertiere*, J.F. Bergmann, Wiesbaden.

UEXKÜLL, Jakob von (1909), *Umwelt und Innenwelt der Tiere*, J. Springer, Berlin.

UEXKÜLL, Jakob von (1910), «Die neuen Ziele der Biologie», in *Baltische Monatschrift*, n. 69(4), pp. 225-239; consulted version in UEXKÜLL, Jakob von (1913).

UEXKÜLL, Jakob von (1913), *Bausteine zu einer biologischen Weltanschauung. Gesammelte Aufsätze*, Bruckmann, München.

UEXKÜLL, Jakob von (1926), *Theoretical Biology*, Kegan Paul, Trench, Trübner and Co, London.

UEXKÜLL, Jakob von (1930), *Die Lebenslehre*, Müller & Kiepenheuer - Orell Füssli, Potsdam - Zürich.

UEXKÜLL, Jakob von (2010a), *A Foray into the Worlds of Animals and Humans*, in UEXKÜLL, Jakob von, *A Foray into the Worlds of Animals and Humans: with A Theory of Meaning*, University of Minnesota Press, Minneapolis-London.

UEXKÜLL, Jakob von (2010b), *A Theory of Meaning*, in UEXKÜLL, Jakob von, *A Foray into the Worlds of Animals and Humans: with A Theory of Meaning*, University of Minnesota Press, Minneapolis-London.

UEXKÜLL, Thure von (1987), *The Sign Theory of Jakob von Uexküll*, in KRAMPEN Martin, OEHLER Klaus, POSNER Roland, SEBEOK Thomas, UEXKÜLL Thure von (Eds.) (1987), *Classics of Semiotics*, Plenum Press, New York-London, pp. 147-179.

UEXKÜLL, Thure von, GEIGGES, Werner, HERRMANN, Jörg M. (1993), «Endosemiosis», in *Semiotica*, n. 96(1/2), pp. 5-51.