

Umwelt and time: Extending the humanistic view on temporality through umwelt theory

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Abstract. The article offers a discussion on the way in which the concept of umwelt can be related to the conceptualization of time and temporality in the humanities – in dialogue with other theoretical frameworks as well as with artistic discourse. The paper examines how Jakob von Uexküll himself wrote about time in the context of his umwelt theory, and goes on to consider how his thought has been creatively developed in the field of biosemiotics. This part of the discussion refers to Kalevi Kull's recent ideas on 'momentary umwelt' and 'umweb' and proposes enhancing these concepts by employing classic Saussurean categories of signs relations, namely, syntagmatic and paradigmatic orders. The next section offers further extending of the proposed considerations to another level, i.e. juxtaposing them with the thought of Bruno Latour and his concept of 'situated time.' This idea is compared to the conceptualization of time within both the momentary umwelt as well as the umweb. Finally, the last part of the paper is dedicated to analysing the previously presented theoretical discussion in the light of a mathematical model of the Möbius strip and artistic discourse: Mieke Bal's thoughts on time and Osmo Valtonen's kinetic sculpture *Circulograph*.

Keywords: time; temporality; umwelt; umweb; situated time; moment of now; actor-network theory

1. Introduction

Time and temporality, alongside space, are recognized as fundamental categories, especially in Western thought. The umwelt theory of Jakob von Uexküll encompasses both categories, although it more often seems to be applied to considerations regarding space. The term 'umwelt' itself refers to the environment, thus it is associated – bearing in mind a plethora of differences and reservations – with such terms as 'environment', 'milieu', 'lifeworld', '*Dasein*', or 'semiosphere'. The choice of concepts or theories depends on the philosophical standpoint adopted:

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for example, in case of a phenomenological approach, ‘umwelt’ is compared with ‘lifeworld’ (the Husserlian ‘*Lebenswelt*’); or a semiotic one, which leads to comparisons with Lotman’s ‘semiosphere’.

However, we can notice that umwelt theory, or even the concept of umwelt itself, is less frequently used in discussions devoted to time. In this article, I will present a way in which the concept of umwelt can be related to temporality in the humanities – in dialogue with other theoretical frameworks as well as with artistic discourse. I am particularly interested in certain conceptual pairs, such as ‘synchronic/diachronic’, ‘now/always’, ‘simultaneous/circular’. These have been discussed before in terms of biosemiotics (cf. e.g. Kull 2017, 2023a, where, for instance, choice, possibility and anticipation are examined) as well as in the field of semiology and Juri Lotman’s semiotics (the question of linearity and non-linearity in reference to the notion of explosion and graduality, continuity and discontinuity, simultaneous possibilities, etc. – cf. e.g. Lotman 2009[1992], 2013[2010]). This paper aims for elaborating on these concepts in reference to the umwelt theory and juxtaposing them with selected conceptualizations of time and temporality already formulated in humanities, especially in Bruno Latour’s writings. In so doing, not only the reflection on presence and future in semiotics might be enhanced, but also the linkages between Latour’s philosophy and semiotics might be highlighted. This article, as a result, offers a contribution to the revision of selected time-related concepts introduced in semiotic and humanistic (in a broad sense) discourse. It should, however, be noted in the beginning that the focus here is put on the present (‘the moment of now’ and ‘always’) and the future (‘possibilities’ and ‘anticipation’), while the past (and irreversible time) does not lay at the centre of the discussion proposed.

In order for this approach to have a chance of development and success, it is first necessary to make an important *caveat* regarding – somewhat ironically – the passage of time. The concept of ‘umwelt’, formulated in the works of Uexküll from the 1930s (although the author first used this term in 1907 – cf. Kull 2010: 44), requires modification if it is to be applied to our contemporary times. The point is not to reformulate this concept radically, but rather to acknowledge that simply transferring it to current realities would not yield the expected results. Ezequiel A. Di Paolo’s (2020: 256) comment on umwelt is valuable in this regard: “[...], we must always understand it dynamically and dialectically, perhaps in ways Uexküll himself might have disagreed with in the 1930s but maybe, who knows, might have found it acceptable were he alive today witnessing the world with which we have surrounded ourselves.” Bearing this in mind, I will examine how Uexküll himself wrote about time in the context of his umwelt theory, and then consider how his thought has been creatively developed in the field of biosemiotics, before

further extending the considerations to another level, namely by juxtaposing them with the thought of Bruno Latour and – finally – with artistic discourse.

2. Umwelt theory: Strolling through temporalities

Let us briefly recap the essence of umwelt theory. In *A Stroll through the Worlds of Animals and Men: A Picture Book of Invisible Worlds* (Uexküll 1992[1957/1934]), the attentive reader will easily discern phenomenological threads. From the very first pages, Uexküll unequivocally advocates for an understanding of animals that would recognize their subjectivity, thereby rejecting the mechanistic approach that was very popular among biologists at the time. Here, we also encounter the well-known soap bubble metaphor: “[W]e must first blow, in fancy, a soap bubble around each creature to represent its own world filled with the perceptions which it alone knows.” (Uexküll: 1992[1957/1934]: 319) This metaphor aims to sensitize us to the individuality of each animal’s lifeworld and its subjective perception. The author repeatedly emphasizes that umwelt is not simply the environment, but the phenomenologically understood lifeworld of the organism, and that this lifeworld is founded on a functional circle (*Funktionskreis*), consisting of a dyad of perception and action, to which we will return. Therefore, the umwelt of each animal is “the world as it appears to the animals themselves, not as it appears to us. This we may call the phenomenal world or the self-world of the animal.” (Uexküll 1992[1957/1934]: 319) The subjective perspective is thus clearly emphasized. Uexküll is the author to whom we owe the subjective approach in biology, and thanks to this he laid the foundations for biosemiotics.

The subjective approach thus defined naturally activates a phenomenological perspective, of which contemporary researchers who engage with this theory are well aware (cf. Tønnessen 2015). However, it cannot be solely confined to phenomenology. As Kalevi Kull (2010: 43) writes: “Umwelt is the self-centred world of an organism – the world in which an organism lives, the one that it recognizes and makes.” Therefore, it is certain that this is an individualizing approach, as there is no such thing as a universal umwelt, one that is common to all organisms – at least in the original version of the theory.

At this point, it is also necessary briefly to recall the concept of the functional circle. Uexküll (1992[1957/1934]: 320, original emphasis) writes: “[A]ll that a subject perceives becomes his *perceptual world* and all that he does, his *effector world*. Perceptual and effector worlds together form a closed unit, the *Umwelt*.” On this basis it can be stated that umwelt is based on the dyad of perception/action. In a somewhat simplified manner, we can say that each organism perceives

the surrounding world differently; different objects become important stimuli for it (perception), and it responds to them differently, i.e. it reacts (action). To this dyad of perception and action, it is worth adding anticipation, which is crucial in the context of time which is our main concern here. Kull (2010: 47) observes:

The work of the functional cycle includes 1) anticipation of the perceptual cue, 2) perception, 3) working out a relation between the perception and action (either just executing a habit, or using representation, or modelling anew), and 4) action (operation).

The ability to anticipate allows organisms to make choices, which are based on interpretation – a capacity exclusive to living organisms. In the context of time, Kull (2010: 47) makes another important remark, reminding us that the concept of the functional circle, which is often compared to the cybernetic concept of feedback, is much earlier than the latter but also richer – precisely because of the element of anticipation.

Let us sharpen the focus on time and temporality. Uexküll (1992[1957/1934]: 326), maintaining a consistently subjective approach in the quoted text, writes:

Time, which frames all happening, seems to us to be the only objectively stable thing in contrast to the colorful change of its contents, and now we see that the subject sways the time of his own world. Instead of saying as heretofore, that without time, there can be no living subject, we shall now have to say that without a living subject there can be no time.

Time thus results from the existence of a subject, being the outcome of its individual perception and actions. There is no objective time, in the sense of time that is common to all. As a side note, Uexküll (1992[1957/1934]: 326) asserts the same about space: “we shall see that the same is true of space: without a living subject, there can be neither space nor time”, but that is a topic for another occasion. Referring to his predecessor Karl Ernst von Baer, he writes that this scientist “has made it clear that time is the product of a subject. Time as a succession of moments varies from one *Umwelt* to another, according to the number of moments experienced by different subjects within the same span of time.” (Uexküll 1992[1957/1934]: 340, original emphasis) As an example of time perceived differently, Uexküll (1934: 340) mentions an experiment with a vineyard snail placed on a rubber ball, carried by water, moving on it without friction, remaining somewhat stationary. If a small stick is placed under the snail, it will climb onto the stick, and if the snail is touched with the stick a certain number of times, it will turn away. This is because all motor processes occur much faster in

the snail's world than they do in ours. At this point, it is necessary to reiterate that if Uexküll's concept is applied in our contemporary context without any modification, it will likely seem to us – at least to some extent – anachronistic, even archaic. There is no doubt that the biological and physical sciences have clearly made significant advances since the beginning of the 20th century, so bearing this *caveat* in mind, let us see how the theory of *umwelt* can be used to conceptualize time nowadays.

3. Umwelt theory is (not) timeless: The biosemiotic view

The ironic title of this section aims to highlight the key issue of the *umwelt* theory most pertinent to these considerations focused on the issue of time. The theory is indeed “timeless”, in the sense that it remains valid beyond the time in which it was created; but at the same time, it is *not* timeless, in the sense that it has a temporal dimension. The theory is also important and relevant in contexts other than strictly biosemiotic discourses. However, before demonstrating how it can be utilized beyond the biological, biosemiotic, and even semiotic contexts, we shall first explore how it can be used today to investigate time within the framework of biosemiotics.

3.1. Memory and anticipation

Firstly, let us recall a strongly time-related pair of notions, i.e. memory and anticipation (that was already mentioned above). The former usually refers to the past, the latter – to the future; however, within (bio)semiotic discourse their conceptualization is far more sophisticated. Memory as such has been approached from various perspectives in semiotics of culture (cf. Lotman's memory-related theory of the symbol as a culture vehicle, for instance in Lotman 2019[1987]), cognitive semiotics and biosemiotics. Since it is the latter that is of special interest here, let us briefly discuss the biosemiotic view on memory as a temporality-related notion. While examining the agency–semiosis relation, Kalevi Kull (2023a: 174–175) lists “several general features” of agential life and semiosis, among which memory can be found. He relates memory to learning, and indicates that not only is memory the effect of the past, but it also influences the future: “If semiosis that creates a relation leaves some traces that modify the semiosis that follows (i.e. if the semiotic system has memory), then it can also learn. Memory as a trace is extrasemiotic.” (Kull 2023a: 175) In this context, he also cites Lauri Linask as saying: “In a cognitive present, memory relates a past choice with future interpretations. From that point of view, memory is not for preserving the past, but for anticipating the future.” (Linask 2022: 197, quoted in Kull 2023a: 175) Such an understanding of memory highlights the continuity of time (the emphasis is put

on the bridge between previous traces of semiosis and an anticipated future) and relates memory to learning.

In the light of the discussion proposed here, we need to add that the “[c]apacity of learning has been demonstrated for single cells” (Kull 2023a: 175), on the basis of which we can assume that memory is not limited to humans only.² In the paper referred to, Kull (2023a: 181, original emphasis) associates memory with semiotic fitting and states: “The effects of choices that influence further choices work as memory – they *are* memory, by definition.” Thus, memory links the results of previous choices with the anticipated ones, influenced by these results. Finally, what is of highest importance here, Kull (2023a: 183) argues that “[d]ue to memory, the trajectory builds an umweb, a model of that space that fits semiotically”, and in so doing contributes to our discussion on the temporality of the umweb.

The juxtaposition of memory and learning being a result of viewing several cognitive processes from a semiotic perspective has been proposed also by Cary Campbell, Alin Olteanu, and Kull (2019: 353): “Our thesis is that semiosis as the fundamental process of meaning-making implies, as its central aspects, learning, memory, and knowing.” Learning, they argue, is a condition for memory to emerge – “memory is the semiotic scaffolding established by learning” (Campbell, Olteanu, Kull 2019: 356) – and in doing so they introduce a very basic definition of memory that is a very inclusive one. What is learnt is not only codes limited to humans such as verbal language or social codes, but information derived from the surroundings that influences an organism’s choices (having results in the future) is part of memory as well (Campbell, Olteanu, Kull 2019: 356). What, in turn, seems to be crucial for the discussion proposed in this paper, is that the reverse direction needs to be assumed too, for “learning requires memory” (Campbell, Olteanu, Kull 2019: 370). Thus, when the umweb is considered and the “always” perspective is taken (see Section 3.2 below) it should be remembered that learning cannot be occasional. Rather, it forms a kind of network that includes the current problem and memory, while being simultaneously related to a more or less anticipated future.

Anticipation is the second time-related notion that needs to be explained here just like the notion of memory discussed above. I propose to consider it from a biosemiotic view, i.e. as an ability humans and non-humans share. Based on the current state, an organism makes choices that, while deriving from the present, influence the future. Obviously, when only nonhuman organisms are considered, the subject’s choices may be caused by e.g. environmental or metabolic changes.

² In another paper, dedicated to the issue of a vegetative subjectivity, Kull (2023b: 67) claims the same on the issue of memory: “Semiotic learning can be defined as leaving a trace from a choice that will influence further choices. This trace will be memory. Learning leads to habits. Learning is a rather universal feature of semiosis.”

On the other hand, however, there is a human-specific anticipation that might be juxtaposed with personal choices triggered by individual, psychological perception or – on a macro level – the current social, cultural, political or economic state (cf. e.g. Lotman 2009[1992], 2013[2010]), which may be more or less conscious.

In this paper, in the broad context of *umwelt* and *umweb*, in which these two notions are considered as kinds of models and theoretical concepts, these differences do not constitute the leading problem under discussion. However, the model-based approach to anticipation may still be mentioned. This approach, even though applied to humans only, corresponds, in my opinion, to a general notion of anticipation. As Katre Pärn (2021: 109) has stated, “In this perspective, the future is not something that simply unfolds in a predictable or unpredictable manner from past and present circumstances, but a set of possibilities that are envisioned, represented, debated over, designed, chosen and fulfilled or disregarded by members of a community.” Such an approach assumes that humans have a unique ability to shape their future, which, obviously, does not apply to nonhuman organisms. What, however, seems to be applicable to all living organisms (although it was not introduced as such) is the model based on “two central notions: semiotic systems are anticipatory systems and anticipation is a model-based activity” (Pärn 2021: 113).

This model offered by Mihai Nadin (2016) presents the future thus:

As a result, the future emerges as a cause for current actions. In other words, anticipation concerns the instances when the current state of a subject/system does not solely depend on the past or current states but is also affected by the model of the possible future. (Pärn 2021: 114)

This statement will be returned to in Section 5.2. Shortly speaking, not only do the past and the current state affect the future, but it is possible the other way around as well. Tying this conclusion to the discussion offered in this paper, it appears that anticipation so considered corresponds with the model of the *umweb*, in which the “always” perspective is assumed. As it will be shown, *umweb* is perceived over the course of time, diachronically and, as a result, is not affected by the choices made “in the moment of Now”.

As can be seen from the above, the key concepts of the contemporary biosemiotic paradigm include agency, subjectivity, freedom, choice, and interpretation. We are familiar with these concepts from the works of Kalevi Kull, Jesper Hoffmeyer, Timo Maran, Morten Tønnessen, and many others. As Bruno Latour has noted, all of these occur in time or times (in the plural). As Kull has emphasized on

numerous occasions,³ umwelt is “the condition for signs to emerge” and “the field of interpretation, of options and possibilities”. Interpretation always presupposes choices, and choices make agents free. To interpret means to be alive. In his text “What is the possibility?” Kull (2017: 16) observes that possibilities do not concern the dead nor those who do not interpret, and he calls this phenomenon the “existence of choice or [...] existence of semiosis”. Choices are made in the moment of Now when the options are given simultaneously, i.e. when we can choose from among several options that appear to be equivalent at that moment.

3.2. Now and always

To avoid devoting too much attention to concepts that I assume are familiar to readers interested in biosemiotics, I will now focus on the latest insights offered by Kull regarding umwelt in a temporal perspective. As Kull presented this at the recent Gatherings in Biosemiotics in Copenhagen in the summer of 2023, ‘umwelt’ in the (bio)semiotic understanding (distinct from the physico-chemical one) can be understood in two ways: (1) as “momentary distinctions made by an organism” and (2) as “the whole library of an organism’s habits (sign relations)”. Kull calls the former ‘momentary umwelt’ and describes it as phenomenal. It is characterized by “the content of Now” and “the complex of distinctions at the present”. He dubs the second way of understanding ‘umweb’, and describes it as a “series of correspondences”. Momentary umwelt is “the field of meanings in the subjective present (fast, semantic)”, whereas umweb is “distributed umwelt; the web of meaning relations or habits over the course of time (slow, pragmatic)”. According to Kull, we can summarize the distinction as follows: “Umwelt is Now, umweb is always.”

Here we have two fundamental insights: firstly, in the biosemiotic conception, umwelt can be distinguished according to the criterion of time, where either the moment of Now – the moment of interpretation and of making choices – is relevant, or else we may consider temporality in the sense of ‘in the course of time’. The second insight concerns the juxtaposition of the phenomenological perspective with the perspective of correspondence. I find this very interesting because, following this line of reasoning, it turns out that umwelt can be compared to Husserl’s *Lebenswelt* only when considered in the ‘Now’ version, i.e. as

³ Kull, Kalevi, “Semiotic fitting and ecological fitting: The open umwelt”. *Semiotic Complexities: Theory & Analysis*. The 4th Conference of International Association for Cognitive Semiotics. Aachen, 15–18 August 2022 [online]; Kull, Kalevi, “Umwelt-based semiotics: Sign and meaning-structure”. XV World Congress of Semiotics, Thessaloniki, 30 August–3 September 2022; Kull, Kalevi, “The concept of umweb: On the linkages between umwelten”. The 23rd Annual Gatherings in Biosemiotics. Copenhagen, 31 July–4 August 2023. (The author’s notes regarding all quotations within this paragraph, K. M.)

momentary, while *umweb* can be compared with the network of relations and correspondences, which is an approach that differs from the phenomenological one and is closer to certain currents of anthropology which will be addressed below. It is worth briefly mentioning here that understanding the world as a series of correspondences is characteristic of the anthropologist Tim Ingold, in the same way that relations are typical of Latour, which Kull (2023a: 179) indicates by describing Latour's actor-network theory as a concept similar to that of 'umwelt'.

With regard to the issue of correspondence, relations, and, above all, the underlying concept of 'network' (Latour's 'actor-network' and Ingold's 'meshwork'), we can briefly highlight one more concept, namely 'umwelt' as a 'trans-sign network', which is Susan Petrilli's idea. In the context of her proposed theory of translation, understood as a process identical to semiosis, she writes: "The *Umwelt* in which semiosis occurs is necessarily a trans-sign or intersign network." (Petrilli 2017: 273, original emphasis) She thereby emphasizes the importance of relations and translation, which, according to her – and in a Peircean spirit –, occurs together with interpretation. Therefore, just as for Kull interpretation always presupposes choice, for Petrilli translation requires interpretation.

3.3. Synchronic and diachronic: syntagmatic and paradigmatic

The pair of oppositions in the title of this section (and also proposed by Kull), overlaps with the one discussed above, namely 'now and always'. When we recall the classic distinction proposed by Ferdinand de Saussure in linguistics, and later widely and enthusiastically applied in semiotics, as well as its various theoretical variants and subjects of interest, this will become clear. 'Synchronic' refers to what is happening in the moment of now, at the intersection of different options. Saussure (1959[1916]: 101) defines 'synchronic linguistics' as follows: "The aim of general synchronic linguistics is to set up the fundamental principles of any idiosynchronic system, the constituents of any language-state", adding that it "penetrates values and coexisting relations". 'Diachronic' means 'in the perspective of time, focusing on the process, change over time, or duration in time'. Saussure (1959[1916]: 140) characterizes diachronic linguistics as follows: "What diachronic linguistics studies is not relations between coexisting terms of a language-state but relations between successive terms that are substituted for each other in time." As Kull (2023a: 171) writes in one of his more recent texts: "The concept of the *umwelt* is divided into two – the synchronic *umwelt* and the distributed or diachronic *umwelt*. For the latter, a new term 'umweb' is introduced." Although the main problem of his text lies elsewhere, I suggest highlighting its temporal threads here.

The moment of contradiction, when inconsistency arises, necessitates choice,

and thus entails semiotic agency. Kull (2023a: 173) describes this moment of incompatibility as the “specious present, the finite moment of the Now, the subjective time”. The organism is faced with a choice, which it makes here and now, selecting from more than one possibility that contradict each other, in the sense that choosing one excludes the other. The choice made in subjective time, in the “specious present”, will naturally have consequences in the future and requires some anticipation. “The nature of the umwelt lies in it being options-provider, and in its simultaneity – it is the space of multiplicity, the multiple at the same present moment, not yet temporally organized. Such features exist only because of the organism, or semiotic agent,” writes Kull (2023a: 173), comparing the biosemiotic umwelt theory with Eero Tarasti’s existential semiotics.⁴ Interestingly, it is not only multiple possibilities that are significant for semiosis and agential life, but also “simultaneity of action and its perception” (Kull 2023a: 175). Furthermore:

What makes a sign relation different from other relationships, is its non-sequentiality, i.e. the simultaneity of its relata. This implies the necessary existence of the extended moment of time – the subjective present – in all meaning-making processes. The complexity of processes that take place at such a single moment of time corresponds to the complexity of the sign as interpreted. (Kull 2023a: 175)

It should now be clear why I chose to include this aspect of the moment of Now in this section of the text, rather than in the previous one dedicated to this topic. To clarify: we are dealing here with a slightly different perspective of understanding the moment of Now, namely the synchronic view. As we can see, there is no room here for sequence, for succession, for one possibility or option occurring after another. For agency to be manifested, simultaneity is needed instead of sequence. “Umwelt as a moment is nonsequential. This implies that decision-making in an umwelt is based, as we can term it, on synchronic logic,” Kull (2023a: 182) adds.

Since, following Kull, we have introduced the synchrony–diachrony dyad into our considerations, I propose activating another axis, also of Saussurean origin, namely syntagmatic–associative relations. It must be borne in mind that these are

⁴ This is a very interesting thread because, as we know, Tarasti proposed his existential semiotics as a perspective for describing and interpreting the world of human existence. Although he often refers to the findings of biosemiotics (I discuss this in Machtyl 2019, 2020) and the concept of ‘umwelt’ (I elaborate on this further in Machtyl 2024), it is primarily a concept applied to humans. Kull (2023a: 173), on the other hand, writes about ‘eco-existentialism’, or ‘bio-existentialism’ and observes: “According to such biosemiotic existentialism, the ‘world’ provides possibilities, and the organism is in conditions in which it has to make choices. This ‘world’, however, is not the environment – it is the organism’s umwelt.” It seems, therefore, that Kull sees a possibility of extending existential semiotics to nonhuman subjects, which is a very encouraging idea for further development.

not relations somehow independent of the synchronic–diachronic axis discussed above, but, as Saussure (1959[1916]: 122) discusses them regarding synchronic linguistics, “[i]n a language-state everything is based on relations”. Syntagm concerns the selection of similar elements from a finite group and their specific necessary order, while associative relations concern an unlimited choice: “Whereas a syntagm immediately suggests an order of succession and a fixed number of elements, terms in an associative family occur neither in fixed numbers nor in a definite order.” (Saussure 1959[1916]: 126) In short, syntagmatic relations can be compared to a chain of units, while associative relations – later replaced by Louis Hjelmslev’s paradigmatic relations – are interchangeable (Chandler 2022: 97–98). Syntagmatic and paradigmatic relationships are described using the connectors employed in classical formal logic: conjunction (\wedge) and alternative (\vee). Conjunction corresponds to syntagm, as it connects successive elements into specific sequences, while alternative corresponds to paradigm, as – based on associative relations occurring in the mind in a given context – a chosen element of the language is used at a given moment.⁵

What relevance does this have to the *umwelt*? According to Saussure, both syntagmatic and paradigmatic relationships relate to the synchronic perspective. They concern the possibilities available here and now, in the moment of Now, simultaneously, not diachronically, i.e. as a sequence, or consecutively. If in this subjective present, as described by Kull, a semiotic agent has several options to choose from simultaneously, they can make a choice based on syntagmatic relationships, i.e. they can choose ‘this’ and ‘that’, because the options are not mutually exclusive; however, in paradigmatic relationships, they can choose either ‘this’ or ‘that’, as the options exclude each other. So, this constitutes a specific supplement to Kull’s concept of ‘synchronic *umwelt*’, because, firstly, choices are made in the moment of Now, simultaneously; secondly, one chooses from more than one available option; but, thirdly – and this was not noticed earlier –, not one option

⁵ In passing, it is worth recalling that in the field of visual semiotics, this distinction is often used with still images, such as photography, being approached from a paradigmatic perspective (something is in the image, something else is not), while the syntagmatic axis is used in the analysis of dynamic images, such as film (successive frames follow one another, creating meaning). See e.g. Lotman 1976: 101 in connection with the analysis of Michelangelo Antonioni’s film *Blow-Up*; and Gillian Rose (2002: 78), who writes in the context of visual advertisement analysis: “Since signs work in relation to other signs, it might also be useful to distinguish between [...] paradigmatic and syntagmatic [signs]. Syntagmatic signs gain their meaning from the signs that surround them in a still image, or come before or after them in sequence in a moving image. Syntagmatic signs are often very important for semiologies of film, since film is a sequence of signs. Thus certain signs in a film may gain extra meaning because they have occurred in a previous scene [...]. Paradigmatic signs gain their meaning from a contrast with all other possible signs.”

only may be chosen (paradigmatic or associative relations), but also more than one option can be chosen (syntagmatic relations). Of course, the syntagmatic synchronic umwelt seems to be more typical of more complex organisms, especially in the case of human umwelten, while the paradigmatic synchronic umwelt is more characteristic of less complex ones.

Let us return to the momentary and distributed (i.e. umweb) umwelten in Kull's text. The former is the umwelt "in the proper sense", which Kull (2023a: 177) describes as follows: "Meaning is the relation that exists now, a difference in the present, atemporally (synchronically) in the subjective time." The momentary umwelt can therefore be described in our typology as both a paradigmatic and a syntagmatic umwelt. Understood in this way, umwelt is "the core sense of Uexküll's concept – subjective space in identical time" (Kull 2023a: 178). For the sake of clarity, to avoid blurring the concepts, Kull (2023a: 177–178) proposes the term 'umweb'⁶ for the second type of umwelt, suggesting that

Distributed umwelt is the web of meaning-relations over the course of time (diachronically), both intra- and inter-organismically. For this, the term 'umweb' is proposed. Umweb is the whole set of sign relations that organisms have throughout their life.

Furthermore, Kull describes 'umwelt' and 'umweb' in terms of opposition: the former is personal and closed, while the latter is interpersonal and open. However – and this is important from the perspective of our discussion, umwelt is the subjective world of the organism (as Uexküll intended) at a given moment, whereas umweb is diachronic, encompassing a longer time perspective, and sometimes also relationships between different umwelten. Umwelt is subject to subjective time, whereas umweb – if we can simplify matters in such a way – is objective, or perhaps 'shared' would be a better word here. Let us recall the words of Saussure (1959[1916]: 140) quoted above: "What diachronic linguistics studies is not relations between coexisting terms of a language-state but relations between successive terms that are substituted for each other in time." In this light, the concept of distributed umwelt (i.e. umweb) seems even more lucid.

⁶ Kull points out that he did not coin the term himself, but borrowed it from Dario Martinelli (see Kull 2023a: 178, fn. 3).

4. Times, spaces, actors, and events: umweb and network

It has been demonstrated that the concept of *umwelt* offers incredibly broad possibilities for interpreting time from a biosemiotic perspective. This section proceeds to investigate how it informs other discourses. “The concept of the *umweb* may help open up the otherwise rather closed *umwelt* (in its phenomenological interpretation) and link the *umwelt* with social and evolutionary processes,” writes Kull (2023a: 187), thus opening our considerations to another perspective, namely that of Bruno Latour. It has been indicated that Kull juxtaposes the concept of *umweb* with Latour’s actor-network theory, and not without reason. As I have written elsewhere (see Machtyl 2019), both Latour’s sociologizing actor-network theory, as well as his philosophy and relational metaphysics, have more in common with biosemiotics than one might expect. Latour, by highlighting the relationships between actants, avoided hierarchies and orders imposed from above: thus, he “flattened” all the inequalities that divide them. Furthermore, all actants are absolutely concrete; their strength and agency do not stem from any inherent properties but are fully dependent on the “here and now” – an actant weakens or gains strength in a specific relationship that occurs at a specific time. Therefore, Latour was cautious about treating time as a separate entity, independent of actants. Graham Harman (2009: 30), a leading expert on Latour’s thought and a representative of the ontic turn in the humanities, writes that:

[...] his entire cosmos is made of nothing but individual actors, events fully deployed at each instant, free of potency or other hidden dimensions lying outside their sum of alliances in any given moment. For this very reason there can be no independent reality known as ‘time’, as if actants were driven forward by some temporal *élan* or *durée*, some flux of becoming distinct from their total reality here and now.

Such an understanding of time brings Latour’s theory closer to the synchronic *umwelt* (whether syntagmatic or paradigmatic), and, thus, to the momentary *umwelt*: everything happens here and now, time is the result of the actions of actants – in the light of the *umwelt* theory, we would say ‘semiotic agencies’ – in subjectively understood present. Moreover, an actant always operates in a concrete relationship, just as meaning in the momentary *umwelt* is the result of relations. The relationality of Latour’s metaphysics is also clearly visible in his concept of mediators and intermediaries: in *Reassembling the Social: An Introduction to Actor-Network Theory* (Latour 2005), active connections are attributed to mediators, passive ones to intermediaries; translations created by mediators are uncertain and not predetermined (the mediator negotiates), whereas the bonds between intermediaries are stable – mediation does not result in surprises. The actor-network theory is thus a sociology of connections: what is social are the connections, short interactions, not

the world of people and their environment. This last point is elaborated in the work *We Have Never Been Modern* (1993), in which Latour puts forward the main thesis of the inseparability of nature and culture, or nature and society.

However, we can note that Kull pointed out similarities between the concept of umweb and Latour's actor-network theory, not – as could be inferred from the above statements – the latter's similarities with the momentary umwelt. At this point, a very important distinction must be made: while momentary umwelt does indeed seem closer to Latour's metaphysical axioms, especially the principles of irreduction and absolute concreteness (Harman 2009: 14–15), as well as Latour's specific understanding of time (a collection of moments rather than flux and flow), the umweb as a network of mutual relations, including inter-umwelten, seems to encompass what Latour (1993: 77) saw as the Middle Kingdom, where the emphasis is placed on the concept of relations and networks. Even the term 'umweb' itself alludes to this: 'um' – from 'umwelt', 'web' – from network. So how to reconcile these two different concepts of the umwelt in relation to Latour? Or, to put it differently – are Latour's ideas closer to the momentary umwelt, or – as Kull proposed – the umweb? A philosophical background comes to the rescue here. As was mentioned above, Uexküll presented a phenomenological perspective, which is why his umwelt is often associated with Husserl's *Lebenswelt* or Heidegger's *Dasein*. His thought is also inspired by Kant – as Uexküll (1992[1957/1934]: 326, original emphasis) himself writes: “[...] without a living subject, there can be neither space nor time. With this, biology has ultimately established its connection with the doctrine of Kant, which it intends to exploit in the *Umwelt* theory by stressing the decisive role of the subject.”

We might be tempted to say that recognizing the subject as a condition for the existence of time aligns Uexküll with Latour's conceptions, but nothing could be further from the truth. Latour shares many of the assumptions formulated within so-called object-oriented philosophy and object-oriented ontology. These currents assume a departure from (post-)Kantian epistemology, referred to as the Copernican revolution, and consequently from the so-called philosophy of access, defining the access of the knowing mind to the known world. Latour protested against comparing Kant to Copernicus: the latter removed the Earth from the centre of the universe, while the former restored a central position to humans (Harman 2013: 66). Harman (2009: 16) adds:

Having abandoned the Kantian landscape of the analytics and continentals, Latour enters exotic terrain. His philosophy unfolds not amidst the shifting fortunes of a bland human–world correlate, but in the company of all possible actants: pine trees, dogs, supersonic jets, living and dead kings, strawberries, grandmothers, propositions, and mathematical theorems.

We must admit that such an approach brings Latour's theoretical position closer to the notion of *umweb*.

So let us see what "exotic terrain" Latour enters. Since it is the issue of time that concerns us here, his position on this matter deserves closer examination. Latour's essay from 1997 entitled "Trains of thought: Piaget, formalism, and the fifth dimension"⁷ can serve as the basis for this part of the discussion. Latour, as he often does in various works, begins by expressing his disagreement with the stance of psychologists and phenomenologists that there exists something like "lived" time.⁸ Phenomenologists and psychologists, Latour continues, do not recognize the existence of scientific, "atemporal" or objective time. They are only interested in "lived time". In his view, this is the opposition of subjective, experiential time to the black-and-white, empty time of physical measurements. In short, for Latour the opposition between objective time and subjective time is fundamentally false. A subject experiencing something does not experience it more in subjective time than in objective time, because, after all, we can measure the time of that experience, or, as Latour would have it: the event. Experience does not exclude the objective passage of time.

So what does he propose instead of this opposition? Intensity and "multiplicity of ways of being" (Latour 1997: 172). We can see how much this aligns with his network theory: the quantity and strength of connections at a given moment determine the strength and agency of a given actant at a given place and time. *Umweb*, in Kull's understanding, seems to correspond perfectly to this understanding, in terms of mutual connections, while the momentary *umwelt* seems to correspond to it in terms of the present moment, the Now. For Latour, as a representative of science and technology studies, the connections between human and nonhuman actants are important, as are those between animate and inanimate nature, technology and the world; hence subjective experiences are just as important as the watch measuring the time of their duration, which should also be clear in the context of the remarks made above regarding the Middle Kingdom and flattened ontology, which makes various actants equal.

In this text, Latour (1997: 174) proposes the dyad of transportation and transformation. Without delving into too much detail, let us just say that this dyad was

⁷ This is the keynote address given at the symposium "Mind and Time" organized on the centenary of Piaget's birth, in Neuchâtel, Switzerland.

⁸ Let us note that, although many observe threads of commonality between Latour's conception and selected positions formulated within phenomenology, Latour dissociated himself from this position. This is also noted by Harman (2009: 26): "It is not phenomenology, because an electric drill or vein of silver are not appearances for human consciousness, but actants that undermine whatever humans encounter of them."

formulated in reference to the aforementioned mediators and intermediaries (Latour 1997: 175) – the former, as active agents intervening in relations causing transformation (over time) understood as modification, aging, and metamorphosis; the latter, as acting without intervening in relations, enabling undisturbed transportation. Time, therefore, passes, but an actant can experience it with varying intensity, different levels of effort, and faster or slower aging. Time and space (because – and this is worth noting – Latour does not want to oppose or separate them), are not the results of measurements or subjective perception. On the contrary, they are the “consequences of the ways in which bodies relate to one another” (Latour 1997: 174). Therefore, time results from the intensity of relations, whereas in Uexküll’s case, as was mentioned above, it was about time generated by the subject. Relations, on the other hand, are certainly the factor that connects Latour’s thought with Kull’s *umweb*.

Another of Latour’s (1997: 174) insights that I would like to draw attention to here is the acknowledgement of the multiplicity of times and spaces as “instead of single space-time, we will generate as many spaces and times as there are types of relations”. When the encountered entities prove to be important for our lives and somehow surprise us, “times and spaces will proliferate. In the opposite case, times and spaces will rarefy to the point of becoming *one* time-space, or even [...] *no* time and *no* space, only *forms*” (Latour 1997: 175). In the world of intermediaries, transportation without transformation will occur, while in the world of mediators, there are many times and spaces. Latour also mentions a third element which, along with time(s) and space(s), forms a triad well known from Algirdas Julien Greimas’ neostructural semiotics, namely, actor(s) or actant(s). It is the agency of the latter, their actions, that can intensify relations, and consequently, enhance intensity: “[...] the question of spacing, timing and acting should always be combined with that of their intensity.” (Latour 1997: 179) This, it seems, is also characteristic of *umweb*, where various types of intra- and interrelations are discussed, given that the *umweb* is open. Various relations between entities, Latour observes, such as the multiplicity of time and space, make it impossible to separate subjective time from objective time. Time is evoked by “surprising differences”, writes Latour (1997: 1990), bringing it closer to incompatibilities, which Kull described as a condition of semiotic agency.

4.1. Umwelt, umweb and network – differences that must not be forgotten

So far, the convergences between the theory of *umwelt* and Latour’s theoretical contributions have been pointed out. However, it is important not to forget that – especially when it comes to philosophical foundations – there are also many differences between them. Let us start by summarizing the current considerations

regarding the two ways of understanding the term ‘umwelt’ – in reference to Kull’s work and our supplements (see Table 1).

Table 1. Momentary umwelt and umweb: a comparison.

momentary umwelt	umweb
the moment of Now	always
temporariness	permanence
finite moment of time	over the course time
individual	common
simultaneous	non-simultaneous
synchronic (both syntagmatic and paradigmatic)	diachronic

We can now see how Uexküll’s concept can be juxtaposed with Latour’s thought, taking into account the differences between them (Table 2):

Table 2: Differences between Uexküll’s and Latour’s thought.

Uexküll	Latour
subject-oriented perspective	event/actant/relations-oriented perspective
phenomenological view	non-phenomenological view
Kantian perspective	anti-Kantian perspective
subjective perception	rejection of the subjective–objective dichotomy
functional circle	intensity of relations

Thus we can see how many differences exist between Uexküll and Latour, and that simple comparisons may sometimes be unjustified. However, I believe that a certain parallelism of thought cannot be overlooked, and although Latour did not refer to the umwelt theory, it is important to acknowledge the parallels discussed above.

5. Strip and circulograph: Discussion

This section will consider two models, one from the realm of mathematics, and the other from artistic discourse. Both will serve to illustrate the theoretical remarks outlined above and help achieve the full scope of the discussion proposed here.

5.1. The Möbius strip: One surface in two

Above, Saussure's theory was already referred to. We can recall that to illustrate the inseparability of the '*signifiant*' and the '*signifié*' as two aspects of a sign, this linguist used the metaphor of a sheet of paper. He assigned the concepts of 'signifier' and 'signified' to either side of the sheet: just as it is impossible to separate the two sides of a sheet to obtain each side separately, so, too, is it impossible to separate the signifier from the signified of a sign. However, a one-sided surface can exist – the Möbius strip, which was discovered, independently yet at the same time, in 1858, by the German mathematicians August Möbius and Johann Listing (Kuzmenko 2021: 13). The strip, although made from a sheet with two sides, is one-sided and has one edge. It can be imagined as a strip of paper with one end twisted 180 degrees and glued to the other end. Such a one-sided surface is called a 'manifold' by topologists, referring to specific geometric surfaces (Crilly 2019: 124).

Jesper Hoffmeyer (1998: 33) referred to this remarkable strip in an aptly titled text, "Surfaces inside surfaces", in which he writes:

The strange thing about the Möbius strip is that inside and outside are co-extensive so that there is only one side, and yet the Möbius strip does in fact produce an asymmetry between interior and exterior. The Möbius strip thus introduces the paradoxical conceptual categories of an 'inside exterior' and an 'outside interior'.

In this article, Hoffmeyer pointed to the determinants of subjectivity, noting that nonhuman living organisms can also be referred to as subjects. A key problem of the text is also code-duality, consisting, in short, of two kinds of messages: those analog-coded (in ecological space; the horizontal semiotic system) and those digitally coded in DNA ("carried forward in time"; the vertical semiotic system) (Hoffmeyer 1998: 34). However, what interests us most is the use of the Möbius strip as a model for distinguishing 'inside exterior' (the *umwelt*) and 'outside interior'. Drawing attention to the asymmetry between the environment and living organisms (the environment is outside the organism and "is there for the organism, not vice versa"), Hoffmeyer (1998: 35–36) invokes the concept of the boundary⁹ (e.g. the cell membrane or the skin) and writes that – from the boundary's perspective – what is inside

⁹ It is consistent with Lotman's conceptualization of the notion of boundary: "The notion of boundary is an ambivalent one: it both separates and unites. It is always the boundary of something and so belongs to both frontier cultures, to both contiguous semiospheres. The boundary is bilingual and polylingual. The boundary is a mechanism for translating texts of an alien semiotics into 'our' language, it is the place where what is 'external' is transformed into what is 'internal', it is a filtering membrane which so transforms foreign texts that they become part of the semiosphere's internal semiotics while still retaining their own characteristics." (Lotman 1990: 136–137)

the organism is “on the outside”. However, the boundary does not resolve the problem of the organism–environment relationship because it does not separate these two entities but “separates the world into two equally excluded parts: an internal part and an external part” (Hoffmeyer 1998: 36).

At this point, we arrive at a crucial issue: Hoffmeyer, in the course of his considerations, refers to the aforementioned essay by Latour and quotes his words: “We never encounter time and space, but a multiplicity of interactions with the actants having their own timing, spacing, goals, means and ends” (Latour 1997: 182, quoted in Hoffmeyer 1998: 37), which leads him to the conclusion that “time is *situated* and loaded with [...] ‘intensity’”. Although Hoffmeyer does not elaborate further on Latour’s idea, let us see – because it is significant for our considerations – how we can relate it differently to Hoffmeyer’s ideas and to the Möbius strip model. First and foremost, I propose using the Möbius strip model to illustrate Latour’s main idea that time (or times in the plural) and space (or spaces) constitute one unity, like the strip.¹⁰ Initially, one might get the impression that, as a two-sided strip cut from a piece of paper, it has, like that piece of paper, two sides – two surfaces that could be attributed to time and space. However, as we have seen, the idea of this strip is different: it is a one-sided surface, and therefore – in our interpretation – it will represent the unity of time and space. Not their simultaneity or equivalence, but unity in the sense of identity. Latour (1997: 172) writes: “Processes are no more in time than in space”. Temporality in relation to *umwelt* is as important as space: the environment or surroundings. *Umwelt* is often compared to Husserl’s *Lebenswelt*, as has been mentioned above several times,¹¹ to emphasize the temporal dimension of the concept of *umwelt* and its later reformulations. Hoffmeyer (1998: 41) writes:

The surface in other words must turn into an interface linking the interior and the exterior [...]. Only then does the system’s understanding of its environment matter to the system, and this is how the logic of the Möbius strip becomes realized IN ACTU: relevant parts of the environment become internalized as an ‘inside exterior’, a phenomenal world or perceptual model which was called the *Umwelt* by Jakob von Uexküll (Uexküll 1982[1940]), and in the same time the interior becomes externalized as an ‘outside interior’ in the form of ‘the semiotic niche’, i.e. the diffuse segment of the semiosphere which the lineage has learned to master in order to control organismal survival in the semiosphere.

¹⁰ Of course, this strip pertains to ideas within the realm of topology, hence space; however, for the purposes of our discussion here, I propose applying it to time and space. Let us also note that the strip itself has a shape resembling the mathematical symbol of infinity, which also alludes – albeit only in shape – to time, as well as to “looping”, as discussed below.

¹¹ Perhaps one might be tempted to coin the neologism ‘*Lebenszeit*’.

In this way he defines the connections between the organism and its environment, or as Uexküll puts it, the organism and the world of its perception. Hoffmeyer (1998: 42) writes about a peculiar “semiotic looping of organism and environment through the activity of their interface”, which brings to mind two observations: (1) that activity, both of the organism and the environment, is fundamental, as with Latour; (2) the term ‘looping’, which is also perfectly applicable to time. “If something should matter to a system then the system must have an existence in time. [...] The temporal surface is linked to the spatial surface [...] time is *situated* and loaded with *agency* – or, with the term Bruno Latour suggests ‘intensity,’” writes Hoffmeyer (1998: 42). So, to repeat, we have two surfaces: the temporal surface and the spatial surface. However, if we were consistently to stick to the Möbius strip model, we could only speak of one surface. I therefore propose to use this model not so much to illustrate solely time and temporality, but to highlight their unity – time transitions into space and *vice versa*, and it is impossible to point out a boundary separating them. “The notion of *event* cannot be differentiated into spatial and temporal components. [...] When a place counts as a *topos*, it also counts as a *Kairos*,” Latour (1997: 178) observes, and the Möbius strip binds the simultaneity of the time–space–actor triad. Umwelt theory, when considered not only from a spatial perspective but also a temporal one, thus reveals its new, potential applications.

5.2. *Circulograph*. “It’s about time!”

In this part of the text, I will refer to an essay by Mieke Bal and her reflections on time, as well as to the work of the Finnish artist Osmo Valtonen. Bal’s text, titled “It’s about time: Trying an essay film”, is an essay about an essay, or rather about essay writing. It was written in the context of working on a film-essay, and the author herself presented it as a special guest lecture at the International Congress “Juri Lotman’s Semiosphere” in Tallinn and Tartu in February 2022. At that time, she highlighted the issue of time and the thought of Lotman (understandably) much more than she does in the text in question. The title is ambiguous and can be understood in two ways: the essay is “about time”, and so is devoted to the theme of time, while at the same time it raises urgent issues requiring quick intervention. Moreover, one more interpretation can also be pointed out: the meaning ‘just in time’. The ambiguity of the title is reflected in the content of the essay. The author is interested in foreseeing the future, “history in its interrelation with the present”, and is concerned about “the indifference of people towards the imminent ecological disaster of the world” (Bal 2020: 27). So the matter is urgent.

In the spring of 2023, the Ateneum Art Museum in Helsinki hosted an exhibition titled *A Question of Time*, and the works presented in it all reflected

[...] one of the most urgent issues on today's world agenda – Nature. For the age of nature is the age which it is said we are now entering; having traversed at ever-increasing speed the anthropocene, we are now beginning to face a world that places humans and non-humans on a more equal footing, as we start to realise the impact of humans on the non-human world. (Crabbe 2023: 1)

We can note that the curators, much like Bal, perceive the issue of Nature as urgent, highlighting the equal treatment of humans and nonhumans (as familiar from Latour's thought) as well as the catastrophic impact of humans on the biosphere. Works utilizing umwelt theory to analyse the ecological crisis, biodiversity, and care for the semiobiosphere are well-known (cf., e.g. Petrilli 2017; Ingold 2000; Maran 2023; Tønnessen 2003). Now, additionally, we can introduce a temporal perspective. One work that particularly caught my attention when I had the pleasure of viewing this exhibition was Osmo Valtonen's kinetic sculpture *Circulograph* (1983), which "invites us to consider the cycles of the seasons [...] with the sculpture's circular movement of grains of sand" (Crabbe 2023: 6).



Figure 1. Osmo Valtonen, *Circulograph* (1983), metal, wood, dia. 200cm. Finnish National Gallery. Photo by Katarzyna Machtyl.



Figure 2. Osmo Valtonen, *Circulograph* (1983), metal, wood, dia. 200cm. Finnish National Gallery. Photo by Katarzyna Machtyl.

First of all, it has to be noticed that this art work takes place in time. The device's arm performs circular motions, and thus creates circular, almost mosaic-like patterns in the sand with grains of different diameters, depending on the position of the arm (Fig. 1). On the one hand, it could be said that the arm duplicates its actions, "going round in circles", or that it is "looped". However, on the other hand, it can be observed that even when moving along its previously self-determined path, it sometimes changes direction, and sometimes the path has differently arranged sand grains (Fig. 2) – one just needs to look closely enough. So this sculpture reflects the circularity of time, the infinite return – like the Möbius strip, yet each time the circles are different. "The brass weight hanging from an arm traces a soft line in the sand. The result is a regular, repeating and constantly redrawn circular pattern. Known as a pioneer of kinetic art, Valtonen was interested in nonfunctional machines."¹² Constantly redrawn, the sculpture illustrates repetition and – paradoxically – constant novelty: the temporality of experience.

¹² Finnish National Gallery web page: <https://www.kansallisgalleria.fi/en/object/577592> (accessed 20 February 2024).

Bal (2020: 30–33) writes about ‘bi-lateral temporality’, by which she means reciprocity and mutuality, as well as ‘pre-posterous history’ as a history that anticipates the future: “I have developed a notion of time that acknowledges that not only the past influences the present, hence, also the future, but also the other way around. [...] Another figural aspect of time is rhythm.” Pre-posterous history circles back, loops. Is it more of an *umwelt* or an *umweb* image? It depends on time! If viewed synchronically, the circulograph will represent the actions of the subject in the moment of Now (the movement of the hanging weight in the sand), if viewed diachronically, we must consider the whole – the intersecting paths laid out by the subject (or subjects), their relationships, past paths, and those that are emerging before the viewer’s eyes. Paths that are yet to be laid out. Paths that arise in time-space or “time-spaces” simultaneously. As we have signaled above (see Section 3.1), Nadin’s model discussed by Pärn, as well the conclusion of the entire paper she proposed, can be applied to Bal’s discussion on time. There is, namely, a striking resemblance between bi-lateral temporality and “pre-posterous history” and the concluding remarks expressed by Pärn. The latter state: “The semiotic study of the future firstly concerns the capacity to model a non-existent object (future states) and, secondly, the capacity of the non-existent object thereby to impact or determine someone’s current action and choices.” (Pärn 2021: 127) It corresponds with Bal’s approach and contributes to the way *umweb* can be described.

The artificial sculpture referred to here offers, along with Bal’s film-essay, one more optics (apart from the *umwelt*-inspired theory and the ecological one) in which time can be considered – the artistic discourse. Circulograph as an artefact may serve as an illustration for the past–present–future entanglement, discussed explicitly by Pärn and Bal and implicitly by Hoffmeyer with the usage of the Möbius strip. “Pre–post” unity or linearity of time seen in the diachronic perspective corresponds with the notion of ‘*umweb*’ as illustrating the feature of permanence and being over the course of time. Finally, it must be noted that both Bal and Valtonen represent art – although belonging to completely different trends – and the message they may have intended to express seems to have a lot in common with the biosemiotic conceptualization of time discussed in this paper.

6. Conclusion

In the text, I proposed a slightly different perspective on the *umwelt*, both in the original version of this concept and in its later modifications, approaching it from a different angle – the perspective of time and temporality, in terms of lifespan (*Lebenzeit*), rather than lifeworld (*Lebenswelt*). Since these two aspects cannot be

separated, we can speak of time-spaces, illustrated by the Möbius strip. As the considerations show, umwelt theory and its reformulations, firstly, reconceptualize time in an extremely interesting way, allowing for a new perspective on pairs such as ‘now/always’ or ‘simultaneous/successive’; secondly, the theory can be applied beyond a strictly biosemiotic discourse, as demonstrated by its application to Latour’s thought. While ‘umwelt as a place’ is a concept often referred to in the humanities and social sciences, ‘umwelt as a concept illustrating the problem of time’ is not so common. As we observed at the beginning of the discussion, umwelt theory has contemporary relevance if it is not used in its original form but adapted to the current context and state of science. Let us recall, therefore, the initial quote from Uexküll (1992[1957/1934]: 326) that “without a living subject, there can be no time”, and add, following Ezequiel Di Paolo (2020: 253), “Organisms are ongoing happenings; organisms claim their place.” Both quotes encapsulate the essence of the discussion conducted here: time and space are a unity, resulting from the actions of individual organisms-actants, forming more or less dense networks of mutual relations.

The discussion proposed in this paper aims to enhance the temporal aspect of umwelt and its relation to other discourses and as such is of a theoretical character. However – and this requires further research – it seems to have an empirical aspect as well. Namely, if the umwelt is to be considered as a model as Riin Magnus and Kull (2012: 650) notice:

As Thomas Sebeok has pointed out regarding the scientific use of the term ‘umwelt’, “the closest equivalent in English is manifestly ‘model’” (Sebeok, 2001, p. 75). The description of a particular umwelt will mean the demonstration of how the organism maps the world, and what, for that organism, the meanings of the objects are within it.

and if we, additionally, take into consideration the anticipation considered as a model-based activity, then as a result we might obtain a useful complex model of (1) understanding and explaining the organism’s actions and choices, and of (2) designing the (to some extent) anticipated (desired or not) future of the organism, no matter if it is human or nonhuman. Such an endeavour may be possible due to highlighting the temporal aspect of umwelt theory.

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Umwelt i czas. Poszerzanie humanistycznego spojrzenia na temporalność poprzez umwelt-theory

W artykule zaproponowano dyskusję nad sposobem, w jaki pojęcie umweltu można odnieść do konceptualizacji czasu i temporalności w dyskursie humanistycznym, zarówno w dialogu z innymi koncepcjami jak i z dyskursem artystycznym. Autorka przedstawia myśl samego Jakoba von Uexkülla na temat czasu w kontekście ‘the umwelt theory’, a następnie rozważa sposób, w jaki ta klasyczna myśl została później rozwinięta na gruncie biosemiotyki. W tej części tekstu autorka odnosi się do najnowszych spostrzeżeń Kalevi Kulla dotyczących konceptów ‘momentary umwelt’ i ‘umweb’ oraz proponuje poszerzenie tych rozważań poprzez wprowadzenie klasycznych Saussure’owskich kategorii relacji znakowych, tj. porządku syntagmatycznego i paradygmatycznego. Kolejna część artykułu proponuje przeniesienie dotychczasowej dyskusji do innego planu, a mianowicie zestawienie jej z myślą Bruno Latoura i jego koncepcją ‘situated time’. Ta idea jest następnie porównana zarówno z ‘momentary umwelt’ jak i z ‘umweb’. Ostatnią część tekstu stanowi analiza wcześniej omówionych propozycji teoretycznych w świetle matematycznego modelu wstęgi Möbiusa i artystycznego dyskursu: przemyśleń Mieke Bal na temat czasu i kinetycznej rzeźby Osmo Valtonena *Circulograph*.

Omailm ja aeg: humanistliku ajavaate laiendamise omailmateooria kaudu

Artiklis arutletakse selle üle, kuidas omailma mõistet on võimalik suhestada aja ning ajalise kontseptualiseerimisega humanitaarias dialoogis teiste teoreetiliste raamistuste ja ka kunstidiskursusega. Käsitluses uuritakse, kuidas Jakob von Uexküll ise kirjutas ajast oma omailmateooria kontekstis ning liigutakse edasi vaatlema seda, kuidas tema mõteteid on biosemiootika vallas loominguliselt edasi arendatud. Selles arutelu osas kasutatakse Kalevi Kulli hiljutisi ideid ‘hetkomailmast’ (*momentary umwelt*) ja ‘võrkomailmast’ (*umweb*) ning pakutakse välja nende mõistete süvendamine, kasutades klassikalisi saussuriaanlikke märgisuhete kategooriaid, nimelt süntagmaatilist ja paradigmaatilist korda. Järgmises alaosas käiakse välja nende kaalutluste edasine laiendamine uuele tasandile, s.t nende kõrvutamise Bruno Latouri mõtetega ja tema ‘kohapõhise aja’ mõistega. Seda ideed kõrvutatakse aja kontseptualiseerimisega nii hetkomailmas kui ka võrkomailmas. Artikli lõpuosa on pühendatud eelnevalt esitletud teoreetilise arutelu analüüsimisele Möbiuse lehe matemaatilise mudeli ning kunstidiskursuse (Mieke Bali mõtted ajast; Osmo Valtoneni kineetilise skulptuur „Tsirkulograaf”) valgusel.