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Carlo Brentari

Jakob von Uexküll

The Discovery of the Umwelt between Biosemiotics and Theoretical Biology



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The Discovery of the Umwelt between Biosemiotics and Theoretical Biology



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Foreword

I was first introduced to the work of Jakob von Uexküll when I was a doctoral student at the Karl-Franzens-Universität of Graz (Austria). The PhD thesis that I was writing, and that would later become a book (Brentari 2007), was dedicated to the philosophical anthropology of the American philosopher Susanne Langer (1895– 1985), a student of Cassirer and Whitehead and a good connoisseur of the German philosophical anthropology. I was studying the second volume of Langer's Mind. An *Essay on Human Feeling*, when I came across a report, certainly partial and not at all systematic, of Uexküll's conception of the Umwelt. In the mentioned work, Langer tries to reconstruct the steps that led from what she sees as the animal organization, based on largely immediate reactions to perceptual stimuli, to a human world made of persistent and complex symbolic representations. In doing so, Langer focuses mainly on Uexküll's description of lower animals, and tends to neglect the many common areas that the Estonian biologist noted between the environments of higher animals and that of human beings. Her aim was to highlight the specificity of man, in line with the belief in the qualitative difference between the animal Umwelt and human world (Welt) that, in the twentieth century, characterized so much of the German philosophical anthropology and philosophy.

After finishing my PhD thesis, I started with the direct reading of Uexküll's texts – first in an occasional way, then with the clear intent to write something about him. Uexküll's writings told another story: not only the relationship between man and animals appeared to be a gradual one, rather than a sudden jump, but (what is more important) the approach of Uexküll appeared more focused on the *meaning* of the different species' environments, than on the respective performances of "man" and "animals". The acknowledgment of the Kantian roots of Uexküll's thought – i.e. of his aim to extend the transcendental approach from human reason to each animal subjectivity – made it possible for me to analyse the different species-specific Umwelten as products of the autonomous constitutive power of a living subject, be it human or animal. At the same time, I would not have fully understood the Uexküllian conception if, besides Kant's influence, I had not paid attention to the semiotic component of the Umwelt: the organisms' ability to create, use and

modify signs and meanings, both in the "interior" constitution of the species-specific environment, and in the everyday life in it. Among the interpreters who made me aware of the need to consider even this aspect I must mention Sebeok and Merleau-Ponty.

At the present point of my confrontation with Uexküll's work, I see the relationship that the animal carries out with its Umwelt as a complex system of biosemiotic interactions; at the same time, I regard animal behaviour not as a set of reactions, however complex, but as the result of the spontaneous attribution of meaning to the outside world, whose environmental elements are actively interpreted by the subject according to the rules of its species. Thanks to Uexküll, the environment of animal species has revealed itself as a field of meaning, that on the one side is rooted in the physiology of the species, but on the other allows the animal subject a high plasticity of action. This perspective can strongly lessen the distance between animals and men, crediting both firstly with the transcendental ability to constitute the conditions of their own experience, and secondly with the semiotic skill to grasp meanings and to use signs. I hope I have succeeded not only in highlighting these aspects of the thought of Uexküll, but also in transmitting the sense of wonder and profound respect that he felt in front of living beings and of their capacity to enrich the meaning of what surrounds them and us.

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Reference

Brentari, C. (2007). La nascita della coscienza simbolica. L'antropologia filosofica di Susanne Langer. Trento: Editrice Università degli Studi di Trento.

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I would like to express my deep gratitude to Marcello Barbieri for his encouragement in realizing this book and for the interdisciplinary suggestions that he gave (and gives) to my scientific activity.

My grateful thanks are also extended to Morten Tønnessen for his rich introduction to the book, to Guido Cusinato, who helped me understand some aspects of the relationship between Uexküll and the German philosophical anthropology, and to Ferdinand Fellmann, Francesco Ghia, Romano Màdera, Ferdinando Marcolungo, Andreas Oberprantacher, Giorgio Vallortigara and Nestore Pirillo for their constant support and encouragement throughout the years of my philosophical research; a special thanks to Silvano Zucal for having said, many years ago: "Why don't you write something about Uexküll?". Finally, I wish to thank all those who have worked at the editing of the book (in its Italian or English edition): Sara Bignotti, Ilario Bertoletti, Fabio Berardini, the translator Catriona Graciet, Catherine Cotton, and Ineke Ravesloot; without their patience and passion, all that would not have been possible.

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Chapter 1 Introduction: The Relevance of Uexküll's Umwelt Theory Today

Morten Tønnessen

Abstract This introductory chapter has three main purposes. The first is to present the book *The Discovery of the Umwelt*, emphasizing its specificity in the context of the international publications dedicated to Uexküll. The second aim is to describe the reception of Uexküll in Norwegian ecophilosophy, and particularly by Peter Wessel Zapffe (1899–1990) and Arne Næss (1913–2009). The third aim is to outline a possible strategy for updating Uexküll's Umwelt conception in a zoosemiotic and ecosemiotic direction. The strategy is based on the idea of comparative mapping of the subjective environments, in order to have a deeper insight of the coding und decoding processes by which different animal species constitute their Umwelt.

Keywords Ecophilosophy • Zoosemiotics • Ecosemiotics • Comparative Umwelt mapping

Not counting Uexküll's own works, Carlo Brentari's book *The Discovery of the Umwelt: Jakob von Uexküll Between Biosemiotics and Theoretical Biology* is in a sense the first English-language, scientific introductory monograph on Uexküll's Umwelt theory.¹ Several dissertations have been written on Uexküll's work, and in 2007 the historian Florian Mildenberger published the first scientific biography

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Portions of this chapter are based on three papers presented at conferences. These are: "We the living: The reception of Uexküll in Norwegian eco-philosophy" (10th International Gathering in Biosemiotics, Braga, Portugal, June 22–27 2010), "In the gaze of the other: Describing cultural affordances by conducting comparative Umwelt mapping in animal studies" (Biosemiotics and the Study of Culture, pre-conference seminar July 16th 2012 ahead of the 12th International Gathering in Biosemiotics, Tartu, Estonia, July 17–21 2012) and "Codes and interpretation in perception" (First International Conference in Code Biology, Paris, France, May 20–24 2014).

¹I say "in a sense" because, for one thing, the genre of Brentari's book is multifaceted. Though it is absolutely *about* Uexküll's Umwelt theory, rather than about Uexküll as a person, it also features biographical and historical elements, as reflected in its systematic presentation and discussion of Uexküll's main works in chronological order. Furthermore, it is definitively scientific, but not in all senses "introductory", given its wide scope and advanced argumentation.

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about Uexküll, *Umwelt als Vision: Leben und Werk Jakob von Uexkülls (1864–1944)* (Mildenberger 2007). Brentari's monograph is based on a translation of his 2011 Italian monograph *Jakob von Uexküll. Alle origini dell'antropologia filosofica* [Jakob von Uexküll: At the origins of philosophical anthropology] (Brentari 2011).

In his book, Brentari starts out with a biographical overview in Chap. 2. His periodization of Uexküll's scientific publications (cf. 3.2 Periodization of Uexküll's Production) forms the basis for much of the remaining structure of this volume. According to Brentari, Uexküll's texts can fruitfully be divided into three periods based on his principal interests and topics. The time frames for these three periods are 1892–1909, 1910–1918 and 1919–1944. Brentari writes that the respective periods are characterized by a first development of a research method and dissemination of results of empirical research (early period), a combination of empirical research and theoretical reflection (intermediate period), and theoretical works (late period).

The first period is covered in Chap. 3 ("The Basis of the Environmental theory"), the second in Chap. 4 ("The Subjective World of the Umwelt") and the third period in Chap. 5 ("The Structure of the Umwelt") and Chap. 6 ("Environment and Meaning"). The concluding Chap. 7, in turn, treats Uexküll's influence on a number of philosophers and other scholars – namely (in this exact order) Max Scheler, Helmuth Plessner, Arnold Gehlen, Ernst Cassirer, Susanne Langer, Martin Heidegger, Ferdinand Ebner, Jacques Lacan, Georges Canguilhem, Maurice Merleau-Ponty, Gilles Deleuze and Felix Guattari, Konrad Lorenz, and finally Thomas Sebeok and contemporary semiotics.

Throughout the text, Brentari combines a biographically and historically informed description of Uexküll's developing ideas and views with occasional evaluation and criticism. Brentari's own views are particularly transparent in the Conclusion section at the end of the book, but increasingly so in the book's last chapters also. *The Discovery of the Umwelt* is thus a book where many voices are heard: Uexküll's voice first and foremost, then secondarily the voices of those he criticized or influenced, and finally the voices of his critics (a group which overlaps considerably with the group of people Uexküll inspired). As Brentari succinctly states in the Conclusion, we need, in our time, a "modification of the concept of Uexküllian Umwelt [which] respects the deepest spirit of the author."

"In order to grasp "Why biosemiotics?"", Magnus and Kull (2009: 125) claim, "one needs to comprehend Uexküll." That is no exaggeration. It is doubtful whether biosemiotics would have emerged at all, had it not been for Uexküll's Umwelt theory. In this perspective, it is quite natural that several biosemioticians are at the forefront of the loose network that in effect represents "Uexküll's modern heirs". Biosemiotics has been central in the contemporary revival of interest in Uexküll's work, which as Brentari outlines followed a period of declining interest in Germany and elsewhere. "The absence of a mental heir, on a par with Uexküll's own rank (except for his son Thure perhaps), who would carry on and expand *Umweltlehre*", Magnus and Kull (ibid., 123) observe, "seemed to lead to the deathblow of Uexküll's research in the two decades following Uexküll's death." This understanding is nuanced, but broadly speaking confirmed, by Brentari, at least as far as biology is concerned. Brentari's focus in his investigation of Uexküll's influence on academic thought and worldviews is predominantly on philosophers. This makes sense given Uexküll's application of philosophical thought, and the explicit and implicit philosophical claims that constitute central parts of his biological theory. It also makes sense given the extraordinary influence Uexküll has had on central philosophers including Ernst Cassirer, Martin Heidegger, Maurice Merleau-Ponty and Gilles Deleuze. As a philosopher himself, Brentari has extensive knowledge of philosophy, and is very capable of tracing the links to classical philosophers such as Aristotle, Plato and Kant. In particular, Brentari is a capacity on the work of Jakob von Uexküll, philosopher Susanne Langer, and ethologist Konrad Lorenz, the latter of whom Uexküll knew personally. Fortunately, Brentari is also more skilled in the history and philosophy of biology than most other philosophers who dare to say something about biological matters.

In the remainder of this introductory chapter, I will refer to selected aspects of Uexküll's life and work, present the reception of Uexküll in Norwegian ecophilosophy,² and assess the need for modernising the Umwelt theory. The section "Updating the Umwelt theory" is followed by two related, more focused sections, entitled "Codes and interpretation in perception" and "Describing cultural affordances by conducting comparative Umwelt mapping" respectively. The first of these connects biosemiotics with code biology, the second aims to make connections between biosemiotics on one hand and Human–Animal Studies and human ecology on the other. In both cases the Umwelt theory, in a modernised version, is proposed as a unifying theoretical framework.

1.1 Life and Work

As is well known, Jakob von Uexküll was neither a philosopher nor a semiotician – and yet his work has had inspirational influence within both philosophy and semiotics, and continues to have this effect today as well, in both areas of inquiry. In stating that "there are as many worlds as there are subjects and [...] these worlds are phenomenal worlds", von Uexküll (1928: 61, cited in *5.3.1 Signs in the Environment: the Transcendental Biosemiotics of Uexküll*) is in effect establishing an alternative ontology informed by biology. In *4.2 The Gegenwelt*, Brentari points out that "one of the most fascinating aspects of the Uexküllian idea of the environment [is] that between the subject (human or animal) and the external reality there is a semiotic relationship, of *interpretation* or even *translation*". As Brentari argues, while *Streifzüge durch die Umwelten von Tieren und Menschen* (von Uexküll and Kriszat 1934³) has been the most successful book by Uexküll in terms of readers

²This subchapter is intended as a supplement to Brentari's broader portrayal of Uexküll's influence. ³Cf. also von Uexküll 1956 [1934/1940] and the most recent translation to English, von Uexküll 2010.

and translations, *Bedeutungslehre* [Theory of Meaning] (von Uexküll 1940) has been less influential generally, but has a central position for semioticians given its detailed semiotic outlook.

A look at the bibliography of Jakob von Uexküll (see References, Chaps. 3-6) is guite telling. Between 1892, the year Uexküll turned 28, and his death in 1844, Uexküll published extensively, usually with several publications each year. But he published no text in 1898, 1906 (the year after he and Gudrun had settled in Heidelberg, where Uexküll had worked as a research assistant in 1888 and 1901– 1902) and 1911. In the years 1911-1914, as Brentari describes in 2.2 Research Trips and Contributions to Physiology, Uexküll carried out research trips in private capacity after having raised funds for this purpose. This is reflected in Uexküll publishing eight articles in 1912 and five or six in 1913. But then Uexküll published only one or two texts in 1914, and only one in each of the years 1915, 1916, 1917 and 1918. The maximum page count for publications appearing in the years 1914-1918 is only 75 pages. Of course, the years 1914–1918 coincided with World War I, and that is part of the explanation of the low productivity these years, given the impact war may have on society at large. Furthermore, as the bibliography shows and as Brentari explains in 2.3 Arising of Political and Philosophical Interests and the Transition to Theoretical Biology, during WWI Uexküll was unable to perform experiments, so he devoted himself instead to taking his theoretical concepts in new directions, particularly a political one.⁴

Brentari explains Uexküll's turn to more theoretical works in his late period, 1919–1944, in part with the First World War's economic consequences for the Uexküll family.⁵ After the war, due to the changes it had brought with it, Baron Jakob von Uexküll lost his nobility, and his whole family lost its land and its assets. Uexküll would to some extent be able to return to experimental work after the establishment in 1927 of *Institut für Umweltforschung*,⁶ a fact which is reflected in examples provided in *Streifzüge durch die Umwelten von Tieren und Menschen* (von Uexküll and Kriszat 1934).

The first few years after WWI stand out in sharp contrast to the mediocre productivity of the war years, with the publication of among other texts *Biologische Briefe an eine Dame* (published as a book in 1920, cf. von Uexküll 1920a) and the first edition of *Theoretische Biologie* (von Uexküll 1920b), followed by the second edition of *Umwelt und Innenwelt der Tiere* (von Uexküll 1921). Uexküll now returns to publishing several texts each year. Even though he formally retired in 1936, this goes on until 1938, the year that Uexküll turns 74, upon which he publishes only one text in 1939. *Bedeutungslehre* (von Uexküll 1940), his last major theoretical work, is published in 1940 along with two other publications, but in 1941 Uexküll publishes

⁴Generally Uexküll's political texts have little value for our own time's ethical discourse, cf. Beever and Tønnessen 2013.

⁵Cf. 3.2 Periodization of Uexküll's Production.

⁶See 2.4 The Institut für Umweltforschung in Hamburg.

nothing, in 1942 only a Spanish translation appears – and the same occurs in 1944, the year Uexküll dies. His last text published while he was still alive was "Darwins Verschulden!" [Darwin's fault!] in 1943 (von Uexküll 1943). By then Uexküll and his wife Gudrun had (in 1940) moved to Capri, Italy, where he would die in July 1944.⁷

1.2 The Reception of Uexküll in Norwegian Eco-philosophy

Peter Wessel Zapffe (1899–1990) and Arne Næss (1913–2009) are two of the foundational figures of Norwegian eco-philosophy (cf. Reed and Rothenberg (eds) 1993). Eco-philosophy is here to be understood as the philosophy of ecology, or more broadly an ecologically inspired philosophical outlook. As a variety of philosophy, eco-philosophy can according to the third classical Norwegian eco-philosopher, Sigmund Kvaløy Setreng (1934–2014), be conceived of as being both descriptive and normative (cf. Kvaløy Setreng 1974, 2004).⁸ This conception is employed in the following. Both Næss and Kvaløy Setreng acknowledged Zapffe's pioneering work in addressing conservation issues, already in the twenties and thirties. In terms of chronology he was the first Norwegian eco-philosopher.

Næss, generally regarded as the founder of deep ecology (Næss 1989), has been influential internationally in the context of environmental philosophy and ethics.⁹ Uexküll's Umwelt theory plays a central role in the doctoral dissertations of both Zapffe (1996 [1941])¹⁰ and Næss (1936), both of which were published shortly after they were written and defended. In the case of Næss, it must be pointed out from the outset that he did not, to my knowledge, refer to Uexküll in the context of deep ecology, which he developed from the early seventies onwards.¹¹ But even though Uexküll, for Næss, mattered first of all in the development of his early, pre-environmentalist philosophy, these connections are arguably of general interest. It remains a fact that Uexküll, the pioneer of ethology, informed the early work of

⁷See 2.5 *Frictions with the Nazi Regime and Death.* The island of Capri was occupied by the US from late 1943 onwards.

⁸Næss distinguished between 'eco-philosophy' as a descriptive discipline and 'ecosophy' (ecological wisdom) as a normative discipline. Zapffe's preferred term for his eco-philosophy was 'biosophy' (meaning something akin to "wisdom of life", and implying an empirical approach informed by biology to the problems of life and to the human condition). In line with his normative orientation, Kvaløy Setreng furthermore frequently referred to 'eco-politics'.

 $^{{}^{9}}$ Cf. "Umwelt ethics" (Tønnessen 2003), which is an attempt to combine the deep ecological platform (Næss 1993: 197) with Umwelt theory. Specifically, this article conveys an Uexküllian interpretation of the deep ecological platform.

¹⁰The thesis includes an English language summary pp. 619–622.

¹¹Neither is Uexküll referred to in *Wisdom in the Open Air: The Norwegian Roots of Deep Ecology* (Reed and Rothenberg (eds) 1993). Few scholars involved in deep ecology appear to be significantly engaged by the work of Uexküll, or aware of Næss' early use of the Umwelt theory.

Næss, who would later become a pioneer of modern eco-philosophy. Uexküll's placement in Zapffe's work is more central, since in his case Uexküll's Umwelt theory constitutes a central ingredient, or premise, in his main work, namely the doctoral dissertation *Om det tragiske*. For Næss, the Umwelt theory was more of a passing interest.

Zapffe and Næss were friends and to some extent colleagues. A passion they had in common was mountaineering, i.e. climbing mountains, and what is in Norwegian called "friluftsliv" (literally: life in the open air), i.e. walking and spending time outdoors, in nature. Their personalities were very different, with Næss being known for his stated optimism on behalf of the twenty-first century, and Zapffe known as a notorious philosophical pessimist (though his writings also involve occasional comedy). In his doctoral thesis, Zapffe actually goes as far as to claim that humankind should voluntarily stop reproducing – this, he states, is the only real solution to all "world problems" (cf. also Zapffe 1993 [1933]).

Despite the fact that Zapffe was some 14 years older than Næss, Næss was early at a more advanced career level than his older friend and fellow climber. He defended his doctoral thesis at the age of 23, and was appointed professor of philosophy at University of Oslo at the age of 27. As a young man, Næss had taken part in discussions with members of the so-called Vienna circle. When Zapffe defended his doctoral thesis in 1941, Næss was the third member of the committee evaluating his dissertation – and with a decisive vote, as it would turn out, since the other two members of the committee disagreed on whether or not to approve it.

Both authors treat and apply Uexküll's Umwelt theory with a view to its implications for humans, or the human perspective. In Zapffe's dissertation, Uexküll is the tenth most cited author (measured by number of page references in the index). He is less cited than playwrights Ibsen and Shakespeare, and Goethe, but almost as much cited as Aristotle and more cited than Kant, Hegel and Nietzsche. In Næss' dissertation, Uexküll is among the five most cited authors (by the same measure), along with Bertrand Russell and ahead of central figures such as Rudolf Carnap (1891–1970), Ernst Mach (1838–1916) and Henri Poincaré (1854–1912). Psychologist Edward C. Tolman (1886–1959) and physicist Percy Williams Bridgman (1882–1961) are among the few that are more cited.¹²

At the time and for the next 30 years or so, Næss was inspired by the positivist idea of unitary science.¹³ The aim of his thesis *Erkenntnis und wissenschaftliches Verhalten* [Knowledge and scientific behaviour] was to offer an "objective-psychological" description of scientific behavior. Some say that Næss in this work placed the natural scientist in the position of the lab rat, and

¹²In the Preface (Vorwort), Næss acknowledges his debt to pragmatists and the Vienna circle, noting that they are not much referred to, despite the fact that they had been the most influential forces for the dissertation. In the dissertation, Charles Sanders Peirce (1839–1914) is referred to once, and William James (1842–1910) and John Dewey (1859–1952) are also referred to.

¹³Later on, in Næss 1972, he would instead favour pluralism and possibilism, which in effect implies acknowledging that radically different theories can be complementary and legitimate.

not everybody was found of the idea. Næss refers to the Umwelt theory as objective-psychologically oriented (Næss 1936: 244) and thus in line with his own preference. In Næss' understanding, the objective-psychological description of scientific behaviour is according to Uexküll's Umwelt theory a part of the "special biology" ("der 'speziellen Biologie") of humans (ibid., 68).

The texts by Uexküll he makes use of is the second edition of *Umwelt und Innenwelt der Tiere* (von Uexküll 1921) and *Theoretische Biologie* (possibly the second edition, Uexküll 1928, though exact information on edition and publication year is not provided). Næss claims that his description of scientific behaviour is "Umweltforschung" in Uexküll's sense – "it concerns the particular Umwelt of scientists" (ibid.).¹⁴ Early on in the thesis, Næss launches a thought experiment (ibid., 9).

A scientist from another solar system comes to our planet in order to investigate its moveable parts – that is, us. The stranger will not be a specimen of *Homo sapiens*, and will further not master the language and the philosophical culture of humans. The only characteristic it has in common with us is its ability to observe certain events/incidents. *How would the stranger describe what we call 'objects and content of knowledge'?*

This thought experiment, Næss states (ibid., 10), "enables us to establish a programmatic thesis about the objective-psychological describability of physical objects and content of knowledge: *The alien scientist can wholly describe physics solely by way of observation of* [...] *the functional cycles of physicists.*" Here, Næss' use of the Umwelt theory resembles Uexküll's own use of it in the final pages of *Streifzüge durch die Umwelten von Tieren und Menschen* (von Uexküll and Kriszat 1934).

Uexküll is mentioned sporadically throughout the text, and a full section, §19 (pp. 64–70), entitled "Die Lehre von der Umwelt eines Tieres" [The theory of the Umwelt of an animal], is devoted to his work. The section falls within the dissertation's second chapter, on existing inquiry of intersubjective and objective-psychological description of objects and content of knowledge. Næss criticises "die Labyrinterkenntnistheorie" [the epistemological theory of the labyrinth], which he associates with behaviourist Karl Spencer Lashley (1890–1958)¹⁵ and physicist and mathematician James Hopwood Jeans (1877–1946),¹⁶ for randomly identifying the *Umgebung* (physical environment) of the human observer with the situation of the observed organism (ibid., 58). The scientist does thus not acknowledge, or realise, that there is a fundamental difference between the Umgebung of the observer and the Umwelt of the observed animal.

Næss' point is recognisably Uexküllian, but it is not entirely clear whether his exact use of the notion of 'Umgebung' is consistently in line with Uexküll's. Most importantly, to the extent that e.g. a lab scientist and a rat are located in

¹⁴Translation here and in the following by M.T.

¹⁵Næss (ibid., 53) refers to Lashley 1923.

¹⁶Næss (ibid., 54) refers to Jeans 1934.

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the same place, the Umgebung could be said to be the same for them. Given Uexküll's perspective it would therefore have been more precise to state that the epistemological theory of the labyrinth erroneously confuses the scientist's *Umwelt* with the rat's Umwelt – or, that this theory confuses the rat's Umgebung (as perceived by the human observer) with the rat's Umwelt.

In Zapffe's dissertation *Om det tragiske* [On the tragic], Uexküll plays the role as *the* biologist, depicting the worlds of the living and establishing the radical difference between the living and the non-living. This extensive text (more than 600 pages) is simultaneously a work of literary criticism, particularly on the genre of the tragedy, and an existentialist treatise aiming to throw "a significant light on the human condition here on Earth" (pp. 620–621).¹⁷ The Uexküllian works Zapffe refers to are *Bausteine zu einer biologischen Weltanschauung* (von Uexküll 1913), and – as in Næss' case – the second edition of *Umwelt und Innenwelt der Tiere* (von Uexküll 1921). Unlike Næss, Zapffe mentions examples of animals having senses humans do not have, or sensing in ranges we do not.

From Uexküll's Umwelt theory, Zapffe learns that there is a fundamental difference between the biotic and the abiotic world. Based among other things on Uexküll's treatment of protoplasm, Zapffe observes that there is a "brotherhood of suffering" extending from the amoebae to the dictator (Zapffe 1996 [1941]: 15–16). Read in context this does not imply any claim that all living organisms are sentient, but rather a claim that all living beings are subjected to living conditions which may be, or in some respects are, unjust. The ever-present possibility of dying, and the fear this omnipresent possibility gives rise to is portrayed as the worst horror of all – especially for the self-conscious humans, whose whole existence can be formed, moulded and ultimately ripped apart under such anxious influences.

Zapffe defines the 'tragic process' in general in terms of "three characteristics: a culturally relevant greatness, or magnitude, in the afflicted individual, a catastrophe that befalls him, and a functional relation between the greatness and the catastrophe" (ibid., 620). Asking whether there is a "wholly necessary tragic", he then concludes that the human kind is a tragic species, because it is mentally (or cognitively, as we might say today) over-equipped. While other animals live in relative harmony, experiencing an overall balance between abilities and needs – here Zapffe builds explicitly on Uexküll's Umwelt theory – humans represent an exceptional species, an exception to the rule. Our behaviour is characterised by radical flexibility, cf. e.g. the fact that the human hand is not a specialised limb. However, we have needs that cannot be satisfied. Zapffe depicts four 'interest fronts', or concerns: The biological, the social, the autotelic and the metaphysical. To varying extent, animals too have a share in the three first interest fronts, and these areas of life humans can happily indulge in. But a human demands more than just this. We expect and demand a meaningful, just world order – but this metaphysical need is in Zapffe's view

¹⁷On a private note, it was while reading *Om det tragiske* during my master studies in philosophy that I first came across Uexküll's work. This discovery in effect brought me to Tartu and to biosemiotics. Translation here and in the following by M.T.

destined for disappointment at best or some kind of denial at worst. The environment is either indifferent to us, or even worse – at times 'satanic' – since the world is not organised according to human principles.

1.3 Updating the Umwelt Theory

As Brentari describes, Uexküll's intellectual development involved moving from the view that "[e]very animal is nothing but an ordered bunch of reflexes" (von Uexküll 1905: 10, in translation), and from using the term 'milieu', to adopt and gradually refine the notion of 'Umwelt' in a direction that in most cases minimises the role played by reflexes (one of seven action types according to Uexküll). Generally speaking, Uexküll's later works are more mature and developed than his earlier works. Some theoretical problems, however, accompany his Umwelt theory no matter what stage of Uexküll's intellectual development we are looking into.

Before we look into the major problems with the Umwelt theory, however, I would like to make clear that there are many more or less hidden nuances in Uexküll's work. Many of these are concisely treated by Brentari. The Discovery of the Umwelt thus shows how Uexküll in effect distinguishes between centered and decentered Umwelten (cf. Uexküll's notion of reflex republics), and between the isolated qualities or properties perceived by lower animals and the unitary, cohesive Unwelt objects of higher animals (the problems of object synthesis and object stability). Furthermore, Brentari communicates Uexküll's view that acquisition of new schemata may occur, and his understanding of the plasticity of human perception and action, how symbolic language enlarges human experience, and what distinguishes the species-specific human role as *the observer*. As Brentari rightly states in 5.2 The Human Observer's Environment, "in its maximum breadth the environment [Umwelt] of man coincides with the world as it is seen by science." Uexküll's nuances are supplemented by Brentari's systematic distinction throughout the book between perception (what is perceived) and reperception (what is perceived in the sense of coming to awareness).¹⁸

There are at least four significant problems theoretically with the Umwelt theory as developed by Uexküll: (1) What Brentari calls his Kantian problem, (2) Uexküll's idea of perfect harmony in the relation between organism and environment, (3) the Umwelt theory's relation to animal psychology, and (4) Uexküll's political use of the Umwelt theory.

The Kantian problem is a problem for anyone who is not a Kantian (of Uexküll's inclination). Brentari emphasises that the root of the problem is related to Uexküll's insistence that there are aspects of nature, or in fact aspects of any existing thing or being, that are unknowable (the Kantian *thing-in-itself*). He furthermore argues that

¹⁸One reason why this distinction is important is that animals do not necessarily reperceive (i.e., are not necessarily aware of) their own actions.

Uexküll's Kantian sympathies and perspectives brings him into trouble whenever he attempts to solve explanatory problems by appealing to uninvestigable rules and plans of nature which are postulated but hard to evaluate – since that in effect contradicts his empirical research program. As if this was not enough, Uexküll's Kantian conviction leads him to portray Umwelten as closed, sealed-off worlds. This said, it is also evident in Uexküll's work that he explicitly explains how he departs from Kant's understanding.¹⁹ Also, as Brentari claims in the Conclusion's *8.3 Limits and Prospects of the Uexküllian Environmental Theory*, Uexküll's "tendency to think of living species and their ecology in terms of animal-environment systems [...] allows him to go beyond Kant, by turning the transcendental subject into an interpreting subject, and by turning environmental experience into a translating and interpreting process."

As with the Kantian problem, Uexküll's idea of perfect, pre-established harmony in the relation between organism and environment is well presented and analysed by Brentari too. In *6.2.2 Individual Recognition and "Companions" in Social Birds* he stresses that in Uexküll's work "dysfunction often appears as an enigma", and that he "tends to silently pass over the potential for misunderstanding or error in the relationship between animals and environment". This is a significant weakness, which must be overcome. Though Uexküll eventually accepted that new species emerge, his version of the Umwelt theory cannot fully explain e.g. extinction whether as normal or as exceptional (as in the era of the Anthropocene). As Brentari says in the *Conclusion*, "nothing stops us from imagining, if we expand the scope of the Uexküllian concepts, a natural evolution of the animalenvironment systems, or even a natural evolution of the environments [Umwelten]". This presupposes admitting "contingency in the formation and modification of environments [Umwelten]". Brentari correctly observes that acknowledging this implies admitting the possibility of imperfection and extinction.

In my own work I have referred to *Umwelt transitions* (see Tønnessen 2009) as a key concept for an updated Umwelt theory capable of addressing issues of environmental change, whether normal or exceptional. An Umwelt transition is defined as a lasting, systematic change, within the life cycle of a being, considered from an ontogenetic (individual), phylogenetic (population-, species-) or cultural perspective, from one typical appearance of its Umwelt to another (ibid., 49). An understanding akin to that in line with the notion of Umwelt transition is in my opinion essential for really acknowledging the spontaneous organizing power of the organism, and for acknowledging animals as autonomous entities.

¹⁹See particularly Uexküll 1928: 3, also cited in *5.3.1 Signs in the Environment: the Transcendental Biosemiotics of Uexküll:* "The task of biology is to expand the outcome of Kant's research in two directions: i. to take into account the role of our body too, in particular of our sense organs and central nervous system, and ii. to investigate the relationships with the objects of the other subjects (animals)". Under i. Uexküll establishes the body as the subject several years before Merleau-Ponty did something similar; under ii. he implicitly establishes an *Uexküllian phenomenology* (cf. Tønnessen 2011a).

This understanding is consistent with the view – which has support in Uexküll's own texts – that intraspecific variability is the norm, not the exception. Critique of the idea that Umwelten are necessarily species-specific will be referred to in the subchapter *Describing cultural affordances by conducting comparative Umwelt mapping*. In my opinion one has to understand that in Uexküll's work, Umwelten are typically presented as species-specific *as a shorthand* to understand other organisms. The purpose of speaking of Umwelten as species-specific is not to make any claim that all Umwelten are species-specific, but rather to present perspectives on Umwelten that are easily applicable and generally meaningful. In other words, Uexküll's portrayal of Umwelten as species-specific should be understood as a pragmatic move, not as an essential one.

The third major theoretical shortcoming, the Umwelt theory's relation to animal psychology ('Tierpsychologie') in Uexküll's depiction, must of course be understood in light of the history of biology and the state of animal psychology at Uexküll's time. Uexküll's renunciation of the ideas of animal psychology was motivated by his resistance to using anthropomorphic concepts. As a result, he ended up going too far in ascertaining that he made no claim about animal minds. Brentari's language in this impressive work is telling of the difficulty associated with avoiding notions such as "awareness" and "perception" - for Brentari himself uses both of them (and rightfully so!), and Uexküll used several comparable concepts. As I state in Tønnessen 2009 (ibid., 61), it is evident that Uexküll in his work in fact does assume the existence of experienced worlds. And in a modern biosemiotic perspective, concepts such as 'perception' and 'action' would be rendered meaningless absent of the assertion that the reconstructed Umwelten of biology and other fields of inquiry aims to be models of experienced worlds which are themselves subjective, private models of the semantically loaded landscape that surrounds Umwelt creatures.

The fourth and last major theoretical shortcoming, Uexküll's political use of the Umwelt theory, is not immanent in his biological theory as such, but instead related to his own interpretation and more-than-biological application of it. Brentari's treatment of Uexküll's socio-political texts is rather short (se particularly 2.3 Arising of Political and Philosophical Interests and the Transition to Theoretical Biology), but he does point out that the biologist's political take on his biological theory lead him, for one thing, to oppose democracy. This was, as Brentari explains, motivated by his refusal to give the individual priority over the social environment. Anyone who is inspired by the Umwelt theory and has an interest in developing some kind of biological worldview – or a biosemiotic ethics – should take note of Uexküll's occasionally reprehensible usage of his biological theory in a political context (cf. Beever and Tønnessen 2013). As seen from our time, Uexküll also entertained a now outdated view on gender differences.

Overcoming the abovementioned theoretical shortcomings by developing Umwelt theory further should be combined with expanding Uexküll's Umwelt theory on areas where there is greater potential for applying it, or for developing it theoretically. More work should be done on human Umwelten. Here, the tripartite Umwelt model, presented in the subchapter *Codes and interpretation in perception*, is meant as one contribution with particular (though far from exclusive) relevance for the human realm. In short, Umwelt mapping and the like only makes sense if the 'ethograms' of Umwelt theory are detailed enough to be applicable in different contexts, including the human context. The concluding subchapter, *Describing cultural affordances by conducting comparative Umwelt mapping*, is similarly meant as a contribution to developing the zoosemiotic (here human–animal) and ecosemiotic (here human–environment) study of natural relations. In the *Conclusion*, Brentari aptly states that Uexküll's work (and, implicitly, an updated Umwelt theory) can be of great use in conservation biology, because it shows us how preserving biodiversity implies protecting "the semiotic, perceptive and operative worlds in which life unfolds."

1.4 Codes and Interpretation in Perception

As Marcello Barbieri pointed out during the opening address of the First International Conference in Code Biology,²⁰ we must not commit the mistake of claiming that *everything* is codes, nor the mistake of claiming that *everything* is interpretation. Therefore, the task of outlining the complementarity of coding and interpretation is crucial. In this subchapter I present work in progress on the role of interpretation vs. coding in perception. My notion of perception rests on the assumption that perception can most often but not always be understood in terms of coherent (i.e. unified) subjective experience. I follow Jakob von Uexküll (1956 [1940], cf. 2010) in assuming that all organisms except plants and fungi have Umwelt experience, and that most animals have coherent, unified subjective experience rather than decentered Umwelt experience.²¹

My starting point is the *tripartite Umwelt model* (Tønnessen 2011a), according to which any Umwelt has two aspects (*core* and *mediated*) and some have three (including a *conceptual* aspect). I theorise that these three layers interact dynamically so that one or two of the layers are occasionally temporarily suspended (in other words, perception is subsequently focused – more or less exclusively – on different Umwelt layers). By *core Umwelt*, I mean the aspect of Umwelt within which one interacts directly and immediately with other creatures or Umwelt objects, in (to use a figure of speech) "face-to-face" encounters.²² By *mediated Umwelt*, I mean the aspect of Umwelt in which Umwelt objects are encountered

²⁰Paris, May 20–24 2014.

 $^{^{21}}$ Plant and fungi are endowed with phenomenal worlds of a more diffuse kind – Uexküll called them 'Wohnhüllen'.

²²However, in all normal instances, i.e. whenever the perceiver e.g. is capable of having memories or at least is capable of anticipating events, our actual encounters with others involves mediation, and thus the mediated Umwelt, as well. Only in exceptional cases, in consequence, are actual "face-to-face" encounters located *solely* within the core Umwelt.

indirectly by way of some mediation (memory, fantasy, anticipation, modern media, etc.). I suggest that this particular aspect of Umwelt can generally be associated with Uexküll's notion of the *Suchbild*, the *search image* (cf. von Uexküll 2010: 113–118). By *conceptual Umwelt*, I mean the aspect of Umwelt in which one navigates among Umwelt objects in terms of predicative reasoning in general or human language in particular.

In Tønnessen forthcoming, I outline the workings of the Umwelt in terms of these three aspects in more detail. We can generally conceive of six types, or categories, of acts, and these can be located within the three different aspects of the Umwelt:

Core Umwelt

- Automated acts of perception
- Automated mental acts

Mediated Umwelt

- Wilful acts of perception
- Wilful mental acts

Conceptual Umwelt

- Habitual acts of perception
- Habitual mental acts

By *automated*, I mean the exact and physiologically based matching of something with something else. By *wilful* I mean the agenda- and interest-driven matching of something with something else. By *habitual* I mean the learned matching of something with something else. Whereas conscious animals carry out all six types of acts, non-conscious creatures, in so far as they perceive, only carry out two, namely automated and wilful acts of perception. Habitual, i.e. conceptual acts, are reserved for conscious creatures, but even bacteria can carry out wilful acts of perception, i.e. make choices based on interpretation.

Above I have defined the conceptual Umwelt as the aspect of Umwelt in which one navigates among Umwelt objects in terms of predicative reasoning. By predicative reasoning, I mean the habitual, mental act of ascribing a specific feature to someone or something. Animals that ascribe specific features to other living beings or objects via mental acts are arguably capable of carrying out a fundamental form of logical reasoning. An animal's capacity for predicative reasoning can be more or less advanced and complex. As we see, we can define the conceptual Umwelt as related to any kind of reasoning.

In general terms automated acts as understood here can be said to be code-based, whereas both wilful and habitual acts are interpretation-based. An implication of this claim is that the core Umwelt is generally code-based, and that the mediated Umwelt and the conceptual Umwelt are interpretation-based. If this is correct, then the interpretive threshold is not located where animals *with* a nervous system meet creatures *without* a nervous system (as Marcello Barbieri has claimed), nor where the biotic meets the abiotic (as Jesper Hoffmeyer (2008) and several others have

claimed). Instead, *the interpretive threshold must be located where core experience meets mediated experience* – and since these aspects often intermingle, the dividing line is not in plain sight.²³

While I have only begun reflecting on the notion of code itself, I will in the following relate codes in perception as presented here to the notions of *neural* codes and *ecological* codes. First, however, a distinction between two fundamentally different sorts of codes is required.

 $CODE_{fix}$ (fixed code): A code which after at some point being fixated remains practically unchanged

CODE_{flex} (flexible code): A code which remains in flux

A retrospective observation is now called for: When I above claimed that in general terms automated acts (whether perceptual or mental) can be said to be code-based, and that the core Umwelt is generally code-based, I had $CODE_{fix}$ (fixed code) in mind. Generally speaking, neural codes can be conceived of as instances of $CODE_{fix}$. In Barbieri's words (2014b),

[t]he transformation of the signals received by the sense organs into mental images, or highlevel neural states, is based on sets of rules that are often referred to as neural codes, because neurobiology has made it abundantly clear that there are no necessary connections between sensory inputs and mental, or neural, images.

Barbieri (ibid.) claims that fishes and some other animals "have virtually hardwired reactions, and in those cases animal behavior is indeed largely accounted for by neural codes only." Nicolelis and Ribeiro (2006: 77) report that

[a]lthough the neural code is far from cracked, we are able to catch, and to speak, a few syllables now, and that was not true just 10 years ago. One important reason that we can already use this idiom is its inherent adaptability, which in turn stems from the network properties of communication through neural ensembles. Even if a few words are dropped, the message still comes across, much the way a robust technological network can rapidly compensate for the loss of a few nodes.

The use of a fixed code, in other words, is not necessarily inflexible as regards its processing – the final outcome is what matters.²⁴ A second retrospective observation is called for: In general terms automated acts can be said to be code-based, *or more specifically based on neural codes*. I thus theorise that there are two kinds of automated (i.e. code-based in the sense of CODE_{fix}) acts which are in sum

²³To what extent this claim is consistent with Marcello Barbieri's view that "neural semiosis is based on coding and interpretation" (Barbieri 2014a) is open to discussion. Questions for further investigation include whether and to what extent coding in automated acts of perception, and in automated mental acts, can be understood within the current framework of code biology (Barbieri et al. 2014).

²⁴Cf. Swan and Goldberg 2010, who in an analysis of Nicolelis' research define "brain-objects" as "the neurobiological intermediary between sensory stimuli and consequent behaviour".