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The Transcendental Biology of Jakob von Uexküll: Environment, Subjectivation, and Relationality

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1. *The Notion of Environment and the Scientific Project of Jacob von Uexküll*

As is well known, Jacob von Uexküll's name is linked to the concept of environment or, at least, to a very specific configuration of it. Indeed, that of environment can hardly be considered a notion endowed with a single, unequivocal meaning, nor can it be considered a clear and distinct concept. As late as 1995, Timothy Luke noted that «despite all of the talk about its central importance, 'the environment' constantly escapes exacting definition»; it has thus ended up, depending on the individual user (the scientist, the historian, the philosopher, the politician), presenting contours marked by «nonexistent, derivative, or vague understandings»[1]. It was, in fact, as an important French geographer observed even before Luke, in the late seventies, a «notion as broad as it is ill-defined»[2]. This ambiguity certainly constitutes a preliminary problem, which deserves to be outlined in its essential features, before understanding how and in what way the notion of environment proposed by Uexküll, as well as the entirety of his complex *Umweltlehre*, can provide a valid support for a broader inquiry concerned with repositioning a specific concept of environment within the wider ecological question. Ecology is, after all, the discipline that specifically studies the relationships between the organism and its environment[3]. Thus, we could pose our more general question in this form: *how can a relation be thematized if its terms are not sufficiently determined?*

As the second term of this relation, the environment arises in contemporary inquiries accompanied by the suspicion that we do not yet possess a genuine theoretical understanding of it. Indeed, the notion has undergone a series of remarkable upheavals, or, as Peter Sloterdijk observed, that of environment has followed «the confusing career that occasionally awaits pseudo-evident concepts»[4]. This «confusing career» begins with a certain morphological and semantic vitality inherent in the term itself among European languages. 'Environment' can be expressed in many ways and with many nuances. Sloterdijk refers to *Umwelt*, which has today become the technical term used to discuss the environment in the German-speaking area. It contains the word *Welt*, meaning 'world', but is circumscribed by the particle *um*, which denotes a circu-

[1] T.W. Luke, *On Environmentality: Geo-Power and Eco-Knowledge in the Discourses of Contemporary Environmentalism,* in «Cultural Critique», 1995, 31, pp. 57-81, 60-61.

[2] G. Bertrand, *Le paysage entre la Nature et la Société*, in «Revue géographique des Pyrénées et du Sud-Ouest», 1978, 49, 2, pp. 239-258, p. 244, my trans.

[3] It is the famous definition given by Ernst Haeckel in 1866, where the newly born ecology was presented as the «entire science of the relations of the organism with the surrounding external world [*zur umgebenden Aussenwelt*], in which, in a broad sense, we may count [*rechnen*] all the conditions of existence» (E. Haeckel, *Generelle Morphologie der Organismen*, Berlin, Reimer, 1866, vol. 2, p. 286, my trans.). The definition was later reproduced in substantially identical form in E. Haeckel, *Natürliche Schöpfungsgeschichte*, Berlin, Reimer, 1868, p. 539 (or p. 645 in the definitive 1873 edition), and in condensed form in E. Haeckel, *Anthropogenie*, Leipzig, Engelmann, 1877, p. 92, as the science of «all the various relations of animals and plants to one another and to the external world» (my trans.).

[4] P. Sloterdijk, *Foams: Spheres Volume III: Plural Spherology*, trans. W. Hoban, South Pasadena, Semiotext(e), 2016, p. 180.

lar motion, a closure. We believe that in this case, as elsewhere, linguistic differences can also be said to underlie conceptual differences. In fact, not all languages speak of the environment in the same way, and this semantic diversity holds its own significance.

For example, we can mention the French case, which employs two terms: *milieu* and *environnement*. The latter is closer to *Umwelt* and is also the original calque for the English term *environment*. It derives from *environ* and *environer*, a verb already present in the *langue d'oil*, that incorporates a similar sense of circularity and delimitation as the German *Umwelt*. Nonetheless, it was *milieu* that prevailed, at least until the 19th century, becoming the term of choice. Etymologically, *milieu* indicates a positioning at the center of space (*mi-lieu*), which seems to suggest the primacy of whoever or whatever is considered to occupy its middle section, that is, to construct or to conceive the vital space starting from a privileged and predominant pole[5].

The Italian language, for its part, has only the term *ambiente*, derived from the Latin *ambiens*. The latter was not used as a noun and it is the present participle of *ambio*, a verb whose primary meaning was 'to move in a circular manner' or 'to surround'. In a now classic study, Leo Spitzer argued that for Greek thought, where the order and finitude of the cosmos were taken for granted and indeterminacy was seen as a sign of distortion, a bounded notion of environment was therefore unnecessary. That idea would begin to take shape only in Roman culture, which, more than any previous civilization, should have felt the need for order amid the ever-moving tendrils of its expansion. The Romans had to perceive the fragility of that order, as well as its dependence on a certain structuring of space itself[6].

In this regard, it is worth noting that the Latin term also bears an additional nuance, a political one. Among its meanings, we also find less frequent occurrences where the verb is used with the sense of 'seeking consensus' or 'soliciting a vote', as well as 'rigging' or 'circumventing' a decision-making process[7].

[5] In one of the earliest technical definitions, *milieu* is characterized as: «a material space through which a body passes in its movement, or, more generally, a material space in which a body is situated, whether it moves or not» (J. d'Alembert, *Milieu*, in J. d'Alembert, D. Diderot (eds), *Encyclopédie*, Paris, Briasson-David-Le Breton-Durand, vol. 21, 1756, pp. 853-855, p. 853, my trans.).

[6] Ancient Greek, in fact, has no direct equivalent for what we now call *environment* or *Umwelt*. The closest term was περιέχον, substantivized participle of the verb περιέχειν. However, περιέχον had the specific meaning of 'air' or 'surrounding climate' as the enveloping element of nourishment and protection, later generalized to also signify 'space' or 'ether'. We refer here to L. Spitzer, *Milieu and Ambiance: An Essay in Historical Semantics* (I part), in «Philosophy and Phenomenological Research», 1942, 3, 1, pp. 1-42. Regarding the later history of the notion, Spitzer observes that: «the Romans were unable to sense the grandeur of all-embracingness, and in their language the substantive *ambiens* is lacking while various verbs, of which *ambire* is only one out of many, vie for the honor of rendering the Greek περιέχειν» (*ivi*, p. 17).

[7] See, for example, Cicero, *Philippics* 11.19 or *De Re Publica* 1.31, and Plautus, *Amphitruo*, Prologue 74; these meanings are also attested in the *Thesaurus Linguae Latinae*, Leipzig, B.G. Teubner, 1900, vol. 1, pp. 1846-1851. It can be argued that an underlying political meaning shall be found in the genealogy of all the core concepts of ecology. This is quite evident in the

This linguistic digression anticipates an intrinsic divergence within the concept of environment which, on the one hand, suggests an as-yet unexplored richness, but on the other, makes a delimitation of its scope necessary. Among these terms, *Umwelt* is one of the most recent and, as we anticipated, it owes its establishment in the technical language of the life sciences to the work of Uexküll[8].

But, before Uexküll, the term already had a history in scientific usage. Its introduction in a technical sense dates back to the late 19th century and is generally attributed to Friedrich Ratzel. As often happens in the history of ideas, *Umwelt* gained its definition following a polemic. The concurrent notion was that of *milieu*. The latter, as it developed, ended up being transferred from its original domain, the natural sciences, to a broader field of knowledge encompassing the cultural and social sciences. Thus, by the time of Comte, it had acquired a distinctly deterministic meaning[9]. Whether indicating merely physical-material conditions or the socio-cultural context, *milieu* had become a compromised and overloaded term. The alternative, as we know, emerged soon enough.

It is not an exaggeration to assert that the speculative construction of the concept of *Umwelt*, as well as its rapid dissemination in intellectual discourse, are largely owed to Uexküll. Even in the early years of the 20th century, he used the term *milieu* reluctantly, burdened by its ambiguity[10]. Only from 1909 onwards, empowered by a more organic and compelling elaboration, did he begin to systematically employ the notion of *Umwelt*, even replacing occurrences of *milieu* in his earlier works[11]. It was not a matter of linguistic preference, but ra-

notion of *territory*, though perhaps less so for that of *landscape*. For the political origin of the latter, see at least M. Warnke, *Politische Landschaft: Zur Kunstgeschichte der Natur*, München-Wien, Hanser, 1992; K.R. Olwig, *Landscape, nature, and the body politic: from Britain's renaissance to America's new world*, Madison, University of Wisconsin Press, 2002, pp. 16-22, and also K.R. Olwig, *Recovering the substantive nature of landscape*, in Id., *The meanings of landscape: essays on place, space, environment and justice*, Oxon-New York, Routledge, 2019, pp. 18-49. Among others, Luke noted that even the English verb *to environ* retains a similar meaning (T.W. Luke, *On Environmentality*, cit., p. 63).

[8] For his biography, we refer to the text written by his wife, G. von Uexküll, *Jakob von Uexküll. Seine Welt und seine Umwelt: Eine Biographie*, Hamburg, Wegner, 1964. To date, the most comprehensive and competent study on Uexküll's life and work is F. Mildenberger, *Umwelt als Vision: Leben und Werk Jakob von Uexkülls (1864-1944)*, Stuttgart, Steiner, 2007. For a contemporary reconstruction of the concept of *Umwelt*, see instead L. Spitzer, *Milieu and Ambiance: An Essay in Historical Semantics* (second part), in «Philosophy and Phenomenological Research», 1942, 3(2), pp. 169-218, and also the entry «*Umwelt*» in G. Toepfer, *Historisches Wörterbuch der Biologie. Geschichte und Theorie der biologischen Grundbegriffe*, Stuttgart-Weimar, Metzler, 2016, vol. 3, pp. 556-607.

[9] As Canguilhem notes, in taking the concept from Lamarck Comte retains a genuinely biological sense and a more flexible usage, but he immediately «yields to the prestige of mechanics» (G. Canguilhem, *La connaissance de la vie,* Paris, Hachette, 1965², p. 166).

[10] J. von Uexküll, *Leitfaden in das Studium der experimentellen Biologie der Wassertiere*, Wiesbaden, Bergmann, 1905, p. 124; see F. Mildenberger, *Umwelt als Vision*, cit., p. 83.

[11] So much so that, the following year, he published the short article J. von Uexküll, *Die Umwelt*, in «Die neue Rundschau», 1910, 5, pp. 638-49. See W. Feuerhahn, *Du milieu à l'Umwelt:*

ther of the necessity to rethink the role and meaning of the environment in light of an original scientific endeavor[12].

Beyond this digression, which we believe was nonetheless important for clarifying what is at stake, what do we truly wish to draw from the work of this singular ethologist? *In what way are the concept of Umwelt developed by Uexküll, and the necessary theoretical constructions behind it, relevant to our general question about the problem of relationality in an ecological sense?* Here, we aim to address three fundamental theses of Uexküll's work, which we believe will bring us closer to recalibrating our question by proposing an alternative path for its speculative framing. We also believe that they will enable us to approach Uexküll's thought from a different perspective than the one through which the dominant critical tradition has sought to interpret his work.

(I) The first can be simply stated: *the animal organism is a subject*. This thesis tackles the problem of the structure of the relationship with the environment, and it will consent us to clarify what this concept means for Uexküll.

(II) The second, which justifies the first, asserts that *the environment is the condition for the animal organism's becoming a subject*. Thus, as we shall see, subjectivity is understood by Uexküll not simply as something stable, but as a process, and, more precisely, as a *process of subjectivation*.

(III) The third and final thesis stands logically prior to the others, maintaining that *the ecological relation depends on a principle that is, in itself, non-relational*. This latter thesis, which underpins the entire framework, opens the door to the transcendental dimension of theoretical biology, and, taken together, we believe that these three points indicate a hitherto unexplored possibility for ecological thought.

2. *Animal Subjectivity and the Meaning of Umwelt*

The fifth chapter of Uexküll's most important work, *Theoretische Biologie,* puts forward a remarkable claim: «every animal is a subject»[13]. The statement is less scandalous than it may appear. Uexküll develops it from a form of Kantianism

enjeux d'un changement terminologique, in «Revue Philosophique de la France et de l'Étranger», 2009, 199(4), pp. 419-438, p. 421, and C. Brentari, *Jakob von Uexküll. The Discovery of the Umwelt between Biosemiotics and Theoretical Biology,* Dordrecht-Heidelberg-New York-London, Springer, 2015, pp. 75 ff.

[12] The shift toward a definitive systematization of the concept of *Umwelt* also marks the abandonment of the tendency (which Uexküll himself had not remained completely indifferent to) of reducing animal behavior to reflex theory or, in Loeb, to tropism. See C. Brentari, *Jakob von Uexküll*, cit., pp. 60-63.

[13] J. von Uexküll, *Theoretische Biologie* (1920), Berlin, Springer 1928², p. 100; trans. D.L. Mckinnon, *Theoretical biology*, Harcourt, Brace & Co.-K. Paul, Trench, Trubner & Co., Edinburgh, 1926, p. 126. It should be noted that McKinnon's English translation dates from 1926 and therefore refers to the first edition of 1920, thus not including the corrections and integrations made by Uexküll in the second German edition of 1928. Where those additions and modifications are absent in the first edition and in its English translation, we will only indicate the pages of the 1928's German edition.

that is undoubtedly heteroclite, yet internally consistent[14]. The status of subject is extended to the entire animal kingdom insofar as every one of its members is granted an active role in the constitution of phenomenal experience. As Uexküll will later state: «*the subject is the new natural factor* [*der neue Naturfaktor*]»[15]. In its way of processing and acting upon the objectivity that shapes its vital sphere, the organism engages with the external world through a network of stimuli and responses, an interweaving of questions and answers.

Every object, before being constituted as such, bears a perceptual mark or cue (*Merkmalsträger*), a sign, which must be decoded along a dual track: on the one hand by the animal's sensory organs, which react to the encounter with the mark, and on the other by its effectors (*Effektoren*), namely, its organic means of acting upon the outside world. These two domains correspond, respectively, to a perceptual organ (*Merkorgan*) and an organ of intervention or action (*Handlungsorgan*). Consequently, for each individual animal two complementary subworlds take shape: a *Merkwelt*, the sum of its perceptual features, and a *Wirkwelt*, corresponding to the totality of actions it exerts upon the external world. Distinct from both is the *Innenwelt*, the animal's world-for-itself, that is the peculiar way in which it reconstructs the unity of its *Merk-* and *Wirkwelten* within its inner life. This combination of the perceptual world and the effective world is «a self-enclosed unit [*eine in sich geschlossene Einheit*], which is governed in all its parts by its meaning for the subject»[16], the *Umwelt*[17].

The connection between the *Umwelt* and the animal subject rests on the fact that perceiving (*merken*) is always conjoined with being active or being effective (*wirken*). Everything that falls within the field of the perceptible immediately carries a practical meaning, and vice versa. The object constituted in perception thus becomes the point of contact between the two movements of this perceptual-practical circuit, which Uexküll calls *Funktionkreis*[18]. It is the perceptual

[14] On the relationship with Kant, whose three *Critics* Uexküll was well acquainted with, see at least C. Brentari, *Kantian monads in a Platonic world. Some remarks on the philosophical background of Jakob von Uexküll's Umweltlehre*, in «Thaumàzein», 2020, 8, pp. 246-259; K. Köchy, *Beseelte Tiere. Umwelten und Netzwerke der Tierpsychologie*, Berlin, Metzler, 2022, pp. 152-161, and K. Köchy, *Biologie als Zusammenhang der objektiven Prozesse mit den subjektiven Phänomenen. Zum Kantbezug von Uexkülls Theoretischer Biologie*, in «Discipline filosofiche», XXXIII, 2023, 1, pp. 113-140.

[15] J. von Uexküll, *Die Rolle des Subjekts in der Biologie* (1931), now in J. von Uexküll, *Kompositionslehre der Natur. Biologie als undogmatische Naturwissenschaft*, ed. T. von Uexküll, Frankfurt a. M.-Berlin-Wien, Ullstein, 1980, pp. 343-356, p. 353.

[16] J. von Uexküll, *Bedeutungslehre*, Leipzig, Barth, 1940, p. 7; en. trans. J.D. O'Neil, *A Foray into the Worlds of Animals and Humans* with *A Theory of Meaning*, Minneapolis-London, University of Minnesota Press, 2010, p. 144.

[17] See J. von Uexküll, *Theoretische Biologie*, cit., pp. 100-20; see also J. von Uexküll, *Biologische Briefe an eine Dame*, in «Deutsche Rundschau», 1919, 178, pp. 309-323 (letters from I to III), and «Deutsche Rundschau», 1919, 179, pp. 132-148 (from IV to VI), 276-292 (from VII to IX), and pp. 451-468 (from X to XII), p. 144.

[18] The idea of a functional circle was elaborated by Uexküll during the 1910s and was consistently reiterated throughout his later works. The *Funktionkreis* was intended primarily to replace the reflex arc (*Reflexbogen*). See C. Brentari, *Jakob von Uexküll*, cit., pp. 100-104. On the configuration and the various modes of action, see J. von Uexküll, *Theoretische Biologie,* cit., pp. 205-211; en. trans. pp. 271-80; see also T. Cheung, *From Protoplasm to Umwelt: Plans and the Tech-*

mark that triggers the subject's reaction, and the subject's activity that constitutes it as meaningful for itself. The animal, in fact, does not directly apprehend the objects of its *Umwelt*, but a complex of references. The object (*Objekt*) is not a thing (*Ding*), but rather the set of properties and characteristics that situate the thing within a network of relations and assign it a specific function. Thus, in every case, the animal orients itself by decoding environmental marks and cues, by decoding their meaningfulness. So, its primary operation with respect to its environment is not merely to construct it, but to *understand* it, and to *interpret* its features[19].

The condition that enables the organism to interpret its environment is not merely sensorial and physiological. It is not enough that the environment should be perceptible through its organs, but also that it is always understandable. This understandability is part of the organism's way of inhabiting the environment even prior to the functional decoding carried out by the senses. The elements encountered in the environment are already predisposed to be understood and acted upon by the animal, offering a counter-movement to its activity which, however, does not establish a conflict or leave behind an opaque remainder, but results in complementarity[20].

This pragmatic-hermeneutic inflection of the environmental relation depends, in turn, on a striking expansion of the table of categories. In order to decode signs, all animal organisms possess their own *a priori* endowment[21].

nique of Nature in Jakob von Uexküll's Theory of Organismic Order, in «Sign Systems Studies», 2004, 32, 1/2, pp. 139-167, pp. 155-159.

[19] On this hermeneutic character, see C. Brentari, *Jakob von Uexküll*, cit., pp. 85 ff. This is the main reason why, in recent decades, it has been primarily semiotics scholars who have revisited Uexküll's work, most notably with T.A. Sebeok, *Perspectives in Zoosemiotics*, Den Haag, De Gruyter, 1972; and with Uexküll's own son: T. von Uexküll, *Die Zeichenlehre Jakob von Uexkülls*, in «Zeitschrift für Semiotik», 1979, 1, pp. 37-47, and T. von Uexküll, *Introduction: Meaning and Science in Jakob von Uexküll's Concept of Biology*, in «Semiotica», 1982, 42, pp. 1-24; see also J. Deely, *Basics of Semiotics*, Bloomington-Indianapolis, Indiana University Press, 1990, pp. 119-124, and, for a brief overview, F. Mildenberger, *Umwelt als Vision*, cit., pp. 231-238. This 'reappropriation' is fully legitimate and consistent, as it rests upon the fundamental consideration that: «the Umwelt consists of meaningful relations of signs» (P. Brains, *Umwelten*, in «Semiotica», 2001, 134, pp. 137-167, p. 141). However, the practice of breaking down the environment into the complex of signs it contains and the modes of their interpretation risks overshadowing the breadth of Uexküll's project. In the *Umweltlehre* he does not merely put forward a theory of environmental interpretation and an animal semiotics, but rather an authentic ontology of the living and, as we'll see, a transcendental philosophy of biology.

[20] «All the objects [*Gegenstände*] in an animal's environment are nothing but bearers of a reciprocal effect [*Träger einer Gegenleistung*], for which the animal holds the key in its own activity» (J. von Uexküll, *Definition des Lebens und des Organismus*, in A. Bethe *et al.* (eds), *Handbuch der normalen und pathologischen Physiologie. Bd. 1: Allgemeine Physiologie*, Berlin, Springer, 1927, pp. 1-25, p. 9).

[21] J. von Uexküll, *Die Lebenslehre*, Potsdam, Müller & Kiepenheuer, 1930, p. 34. See L. Guidetti, *La Biologia teoretica di Jacob von Uexküll*, in J. von Uexküll, *Biologia teoretica*, ed. and trans. L. Guidetti, Macerata, Quodlibet, 2015, pp. XI-LVI, pp. XXXVII-XXXVIII. Contrary to Lorenz (K. Lorenz, *Kant's Lehre vom apriorischen im Lichte gegenwärtiger Biologie*, in «Blätter für Deutsche Philosophie», 1941, pp. 94-125), the dimension of the *a priori* in Uexküll is not only

Every quality (such as a particular smell or a particular color), in the way it is constituted by the subject within the functional circuit of its experience, must already be available *a priori* within its configurational structure[22]. There is a precise *rule* of *form development* (*Formbildungsregel*) that directs the organism to develop a given capacity through a specific organ, which in turn is subordinated to a *meaning rule* (*Bedeutungsregel*)[23], that configures its empirical application *a priori*, in a manner analogous to Kantian schematism.

It is not, in fact, the particular quality that constitutes a condition of experience, but rather the typical procedure through which the organism can constitute and comprehend it: the application of the category to space-time. In this sense, *capacity precedes quality*. Before the actual experience of a certain sound (*Ton*), for example, there must already be present in the subject a receptive capacity correlated with it, enabling the sound to enter into its experience and to be endowed with a particular meaning[24].

We thus arrive at a first conclusion: through its own distinctive access to experience, tied to its a priori capacities for decoding, each organism organizes its own environment, constitutes within it references endowed with meaning for itself, and stands in «a meaningful relation [*in einen sinnvollen Zusammenhang*]»[25]. This relation marks the distinction from the surroundings, the *Umgebungen*[26]. What simply appears as visible around the animal, that in which it is embedded, does not, in fact, coincide completely with its *Umwelt*[27]. The environment is solely that which the organism interprets as meaningful within its experience and according to its specific decoding capacities. It is its world, temporally and spatially determined and subjective, its proper *Außenwelt*, to which it is bound by a relation whose salient features are *qualitative*.

The animal's experience indeed involves a determinate portion of the world in which all stimuli and signs, the perceptual marks, are fully decipherable to it.

preserved but also decisive and essential for the construction of the natural sciences, as we shall see shortly.

[22] J. von Uexküll, *Theoretische Biologie*, cit., pp. 71-2; en. trans. pp. 84-6. See M. Esposito, *Kantian Ticks, Uexküllian Melodies, and the Transformation of Transcendental Philosophy*, in F. Michelini, K. Köchy (eds), *Jakob von Uexküll and Philosophy. Life, Environments, Anthropology*, New York, Routledge, 2020, pp. 36-51, pp. 40-41.

[23] J. von Uexküll, *Bedeutungslehre*, cit., pp. 23-28; en. trans. pp. 161-168.

[24] See J. von Uexküll, *Biologische Briefe*, cit., p. 312. And, shortly thereafter, he specifies that: «the mental organization [*Gemütorganisation*]» is «the precondition [*Vorbedingung*] of all experience» (*ivi,* p. 316, my trans.).

[25] J. von Uexküll, *Die Rolle des Subjekts*, cit., p. 353.

[26] The distinction is explicitly clarified in J. von Uexküll, *Bausteine zu einer biologischen Weltanschauung, Gesammelte Aufsätze*, München, Bruckmann, 1913, pp. 71-72. See also G. Canguilhem, *La connaissance de la vie*, cit., pp. 180-181, where Canguilhem describes the *Umwelt* as the result of an elective extraction that the living being performs on the totality of the physical-geographical aspects of its surroundings (*Umgebungen*). We nevertheless consider this a reductive description, since it is not merely a selection but something much closer to a pre-understanding or prejudgment.

[27] See A. Pobojewska, *Die Subjektlehre Jacob von Uexkülls*, in «Sudhoffs Archiv», 1993, 77(1), pp. 54-71.

An environment is the correlate of *an* organism, inseparable from it. It corresponds, in fact, to the direct extension of its body and capacities, as in the famous case of the tick, whose environment results from only three elementary operations (following the odor of butyric acid, perception of the skin temperature of the mammal, and the tactile sensation of a hairless part)[28] or, to use another example, the relationship between the octopus and the sea. The subject-octopus is indeed in relation to the characteristic element of its vital environment, seawater, which here constitutes the *carrier of meaning* (*Bedeutungsfaktor*) brought into play. The pressure exerted by the water is the prerequisite for the octopus to form its mantle cavity, which then allows it to store and expel large quantities of fluid, enabling it to swim in its characteristic manner (jet propulsion)[29].

In this case, the rule of form development configures swimming, an action procedure, and it is through this swimming schema that the octopus and the sea can enter into a relation that supersedes the individual case. 'Swimming', even when expressed in the octopus's specific manner, does not constitute a merely individual rule, but a procedure common to an entire class of marine organisms, allowing them to be subsumed under a certain group (that of animals equipped with a natatory organ). The specific case thus extends to a general rule, which is nothing other than the capacity to carry out a given activity. It is thanks to this type of approach that Uexküll can claim that «Nature teaches no lessons at all»[30]. From it, we instead learn, from time to time, specific rules of operation, individual action procedures, and *modes of existence*.

3. *Relationality and the Becoming of the Subject*

Although it has attracted the most attention among interpreters, including philosophers, we believe that the subjective component of Uexküll's framework is not the decisive one. The relationship with the environment should never be considered one-sided. Between the two terms, organism and environment, neither is dominant. They are bound together in such a way that «one could not exist without the other»[31]. For Uexküll, every individual organism exists within its «invisible soap-bubble [Seifenblas]»[32]; a vital unity composed of subject and environment. What characterizes this bubble is its delimitation and its functional autonomy:

> Only when we can vividly imagine this fact will we recognize in our own world the bubble that encloses each and every one of us on all sides. Then, we will see each of our fellow human beings as being enclosed in bubbles that effortlessly overlap one

[28] See J. von Uexküll, *Streifzüge durch die Umwelten von Tieren und Menschen,* Springer, Berlin 1934, pp. 1-10; trans. J.D. O'Neil, *A Foray into the Worlds of Animals and Humans* with *A Theory of Meaning*, cit., pp. 44-52.

[29] J. von Uexküll, *Bedeutungslehre*, cit., p. 33; en. trans. pp. 173-174.

[30] Ibid., p. 32; en. trans. p. 171.

[31] J. von Uexküll, *Theoretische Biologie*, cit., p. 62; en. trans. p. 71.

[32] Ibid., p. 62; en. trans. p. 72.

another because they are made up of subjective perception signs. There is no space independent of subjects. If we still want to cling to the fiction of an all-encompassing world-space, that is only because we can get along with each other more easily with the help of this conventional fable[33].

Therefore, *there are as many different environments as there are subjects*[34], each enclosed in its own monad-bubble. The bond between these two components is not symbiotic, since symbionts remain separate individuals that combine. Here we do not have two heterogeneous units meeting, for which both agreement and conflict would be possible; rather, for Uexküll, we always find them together in an astonishing consonance (*erstaunliche Übereinstimmung*)[35]. Inside the bubble just mentioned, there is not an individual facing something unpredictable and unknown, but a stable correspondence that manifests as concrete activity: interpreting, orienting, stimulating, suffering, perceiving, and so on. Consequently, the environment will always emerge as a nexus of «familiar paths» or as an *Heimat*[36], a familiar and domestic environment, which we might also call an animal *Lebenswelt*[37].

What matters most, however, is that from this perspective *individuality is always a duality*, or, in other words: *the organism corresponds to its environment*, and *the environment corresponds to its organism*. Following Buchanan, we understand this identification in a processual manner, so that *there is a continuous becoming-environment of the organism that coincides with a becoming-organism of the environment*[38].

[33] J. von Uexküll, *Streifzüge*, cit., p. 30; en. trans. p. 70.

[34] J. von Uexküll, *Theoretische Biologie,* cit., p. 61; en. trans. p. 70. Or, as we can read elsewhere: «no single property of matter remains constant as we course through the series of environments. Each object observed by us changes not only its meaning tone but also the structure of all of its properties, in form as well as content, from environment to environment. In this human environment, matter is the *rocher de bronze* on which the universe seems to rest, yet this very matter volatilizes from one environment to another» (J. von Uexküll, *Bedeutungslehre*, cit., p. 54; en. trans. p. 197).

[35] J. von Uexküll, *Theoretische Biologie*, cit., p. 68. The obvious analogy to Leibniz's monadology had already been noted by contemporaries, such as H. Lassen, *Leibniz'sche Gedanken in der Uexküll'schen Umweltlehre*, in «Acta Biotheoretica», 1939, A5, pp. 41-50. Lassen assures us, among other things, that Uexküll had never read Leibniz directly (*ivi*, p. 49). For more recent studies, see at least R. Langthaler, *Organismus und Umwelt: Die biologische Umweltlehre im Spiegel traditioneller Naturphilosophie*, Hildesheim, Olms, 1992, pp. 162-166; L. Guidetti, *Jakob von Uexküll tra Kant e Leibniz. Dalla filosofia trascendentale alla topologia del vivente*, in «Rivista italiana di filosofia del linguaggio», 2013, 7(2), pp. 66-83, p. 77; C. Brentari, *Kantian monads*, cit., pp. 249-252.

[36] J. von Uexküll, *Streifzuge*, cit., pp. 63-72; en. trans. pp. 98-107.

[37] On the relationship between Husserl and Uexküll, and on Husserl's reading of the concept of *Umwelt*, see A. Gentili, *La Umweltlehre tra Uexküll e Husserl*, in «Discipline filosofiche», XXXIII, 1, 2023, pp. 67-92.

[38] B. Buchanan, *Onto-Ethologies. The Animal Environments of Uexküll, Heidegger, Merleau-Ponty and Deleuze*, New York, SUNY Press, 2008, pp. 33-34. Thus, for example, one can speak of a 'becoming-flower' of the bee that corresponds to a 'becoming-bee' of the flower. This is, evidently, Deleuzian language. Gilles Deleuze himself, however, was a (albeit partial) reader of Uexküll, who is interpreted as 'Spinozist'. On this relationship, see *Ibidem*, pp. 154-186; S. Leclercq, *Jacob von Uexküll*, in S. Leclercq (ed.), *Aux sources de la pensée de Gilles Deleuze*, vol. I,

For if the subject is such insofar as it understands and acts in concert with the environment, its primary characteristic can be nothing other than this activity, itself determined by its perceptual capacities, which are simultaneously capacities for action. Thus, the subject-organism is equivalent to its environmental activity, simultaneously perceptive and operative.

We must therefore consider this the conclusive outcome of the ecological relation described by Uexküll: a kind of dynamic identity subjectively characterized, presupposed, and already given in ordinary experience, in the solitude of a monadic enclosure? After all, Uexküll himself states that is impossible to step outside the subjective boundaries of individual capacities, and that «our means for experience are at the same time the limits [*Grenzen*] of our experience»[39]. If we were to stop at this level, we could legitimize a partial reading of Uexküll's work. And it would confirm Lukács' dismissive judgment, according to which we would have before us «the most grotesque example» of «modern relativism»[40], in which subjectivity positions itself as the ultimate boundary from which the entire world takes shape, amounting to nothing more than the represented world of a solitary, individual experience.

We believe there are two reasons to move away from those conclusions. The first is that we would remain at a merely empirical-perceptual consideration of the *Umwelt*, which by no means exhausts the scope of the problem Uexküll had set for himself. The aim was, in a Kantian sense, to trace the *a priori* conditions for the knowability of the organism-environment relation with reference to the possibility of real experience. The second is that the subject is neither the endpoint of the inquiry nor its cornerstone[41]. It is here that we fully

Mons, Sils Maria, 2005, pp. 230-239; C. Brentari, *Jakob von Uexküll*, in G. Jones, J. Roffe (eds), *Deleuze's Philosophical Lineage II*, Edinburgh, Edinburgh University Press, 2019, pp. 75-94; F. Cimatti, *From ontology to ethology. Uexküll and Deleuze & Guattari*, in F. Michelini, K. Köchy (eds), *Jakob von Uexküll and Philosophy*, cit., pp. 172-187; T.E. Feiten, K. Holland, A. Chemero, *Worlds Apart? Reassessing von Uexküll's Umwelt in Embodied Cognition with Canguilhem, Merleau-Ponty, and Deleuze*, in «Journal of French and Francophone Philosophy», 2020, 28, 1, pp. 1-26; and also A. Gentili, *Un'etologia spinozista. Gilles Deleuze lettore di Jacob von Uexküll*, in «Lo Sguardo», 2025, XLI (forthcoming).

[39] J. von Uexküll, *Biologische Briefe*, cit., p. 142, my trans.

[40] G. Lukács, *Werke 12: Ästhetik, Teil I. Die Eigenart des Ästhetischen: 2. Halbband,* Darmstadt-Neuwied, Luchterhand, 1963, p. 628 n., my trans.

[41] Feiten distinguishes between two senses of *Umwelt*: one in which it is used in the purely subjective sense of individual experience, therefore in the proper sense of Uexküll, and another in which it denotes the set of what is perceptible solely based on an organism's sensory endowment, the way the term is used by authors such as Dennett (T.E. Feiten, *Mind After Uexküll: A Foray Into the Worlds of Ecological Psychologists and Enactivists*, in «Frontiers in Psychology», 2020, 11, 480, pp. 3-5). In this second case, the investigation is limited to physical possibilities (e.g., based on depth or color perception afforded by the visual organ, or tactile distinctions transmitted through a given nervous system, etc.) and reconstructs an image understandable to us (e.g., dichromatic rather than trichromatic). This purely mechanical approach to *Umwelt* is a flaw of many theories of perception which, as such, risks to abandon the proper terrain of philosophy.

encounter the perspective of a transcendental philosophy[42]. The question concerning the conditions of experience is not resolved in a merely temporal presupposition (such as, for example, the presence of a visual receptor as a condition for sight), nor does it stop at a psychological dimension or rely on the individual consciousness alone. Indeed, Uexküll's answer does not involve the structure of consciousness at all. On the contrary, the latter is set aside in order to avoid an undue projection between human and animal faculties. It is the sense organs that certainly allow a single perceptual experience to take shape as such and remain distinct from others, but there is a prior principle that surpasses this empirical consideration and its consequent relativism.

The reciprocal becoming of subject and environment within the indivisible identity of the monad-bubble would be entirely incomprehensible if the conditions of subjectivity did not lie *beyond* the subject itself. The fundamental relation between subject and environment does not translate into one between a subjective pole (a consciousness or an ego) and an objective one (a complex of things or the sensible manifold that awaits being ordered), but rather into the operative structure of the *Funktionkreis*, which ensures the continuous maintenance of perception and action. Objects and subjects constitute themselves as such only internally to a functional circle, as an effect, thus a product, of a relational activity. Thus, it is on the basis of a relational nexus, between organisms and environment, that the dynamic operation of decoding can take place and, each time, bring forth both a necessity of meaning and a carrier of that meaning. The distinction between subject and object emerges only *ex post*[43].

Although Uexküll's monads are autonomous and distinct from one another, each follows its own process of formation. Organism and *Umwelt* are structured reciprocally based on processes of configuration that precede and guide them. Here we arrive at a decisive point, which we believe much of the existing literature has overlooked. For in Uexküll there is not merely a claim (and, also, a rather unoriginal one) of the primacy of the notion of subject in biology, nor an updated rationalist vitalism, which would then take on hermeneutic-semiotic hues. The entire framework, instead, relies on a *transcendental theory of subjectivation*. This is not the terminology used by Uexküll, but we believe it is consistent with his overall project. What we mean by this expression is that the organic production of subjectivity is conducted according to a principle irreducible to simple empiricism, or to a theory of perception. There must be a principle, *a priori* and *pure* in the Kantian sense, that guarantees the process.

Another example can help clarify what this transcendental turn entails, configuring both the environment and subjectivation along with its typical performances. Observing the common phenomena of a spider's web, Uexküll notes that: «the most miraculous thing […] is the fact that threads of the web are

[42] See L. Guidetti, *Jakob von Uexküll tra Kant e Leibniz*, cit., and C. Brentari, *Jacob von Uexküll*, cit., pp. 107 ff.

[43] As Cimatti rightly observes, at this level there are no subjects and objects, but only relations that produce effects (F. Cimatti, *Con Uexküll, oltre Uexküll. Per un'ontologia relazionale*, in «Discipline filosofiche», XXXIII, 2023, 1, pp. 45-66, p. 56).

spun so finely that a fly's eye with its crude visual elements cannot spot the web»[44]. Thus, the spider can catch the fly and devour it. Should we then conclude that the web is an image (*Abbild*), or portrait, that the spider makes of the fly, so that only from an *ex post* knowledge of the fly, of its form and behavior, can the spider weave the web in such a way that it remains invisible to its prey? This would make the spider a skilled tailor, or even a competent ethologist, and the structure of the web would mirror the gains of its experience (observation, measurement, adaptation). Yet, Uexküll continues, «the spider does not do that at all. It weaves its web before it has ever met a physical fly», so that the web cannot be «a representation of a physical fly, but rather, it represents the *primal image* [*Urbild*] of the fly, which is physically not at all present»[45]. This *Urbild* is in no way derived from experience.

In the organic composition of the spider, and reflected in the web it constructs, there is something analogous to the fly, a kind of primordial code of the fly itself, which the spider incorporates into its action and into the way it structures its living environment and operates inside it. It is as if every living being possessed its own *score*, a species-specific code, and that its existence consists in the actualization of that score. And these codes are form-building, and we could also call them morphogenetic, because they are the ones that give rise to all forms in Nature. They also seem to possess a modular character, a net of «meaning connections»[46], so that the spider contains within its genetic composition something that belongs to the fly, which becomes externalized in its environmental intervention, manifesting differently each time depending on the circumstances. In the spider's score we find the *Urbild* of the fly, as if they were two different musical instruments playing the same combination of notes: one through flying, the other through weaving. For Uexküll, who could not yet have known the hypotheses of behavioral genetics, the presence of these original schemes in an animal's environmental activity could only be explained as the existence of an *a priori* endowment of intervention procedures and pre-understanding, independent from the empirical dimension[47].

The individual codes are not infinite, yet their possible combinations and variations are countless[48]. In every iteration, there is indeed the possibility that an original element may emerge, just as the same musical score, even when performed with the same instruments and by the same musicians, presents something new in each repetition of its variations. It is precisely the performative character of the living being that constitutes its uniqueness. This capacity

[44] J. von Uexküll, *Bedeutungslehre*, cit., p. 20; en. trans. p. 158.

[45] Ibid.; en. trans. pp. 158-9.

[46] Cfr. ibid., p. 23; en. trans. p. 161.

[47] It is, as in Kant, a composition that is in a certain sense mixed, opening up to a strong degree of constructivism (the subject constitutes the objectivity of its experience through its organic endowment), yet grounding it in an innate component: the logical-formal structure of experience, the schema or score, must be present and operative prior to any possible experience. The latter is the structure to which we refer as transcendental.

[48] J. von Uexküll, *Theoretische Biologie,* cit., p. 71; see also M. Esposito, *Kantian Ticks, Uexküllian Melodies*, cit., pp. 40-41.

for differentiation is afforded by the invariant of the original code, which forms the core of its individual development. Only on the basis of the identity (of the species) to which it refers can the individual operation concretely distinguish itself, varying and interpreting the communal theme. Were that identity not already present, there would be no possibility of differentiation at all, only a generic irreducibility.

Indeed, without that common background, there would be no scientificity at all in the research of natural sciences. For Uexküll, biology should not even follow the criterion of *truth*, understood as the most complete and unified image possible of a certain situation, but should instead follow the criterion of *order*[49]. Order supersedes truth. Investigated without any delimitation, the totality of natural phenomena indeed manifests an overabundance of processes, forms, and connections, in an endless accumulation of particulars lacking a unified meaning. «If we approach nature from this starting point», Uexküll observes, «we see it as an immense drama, extraordinarily complex»[50]. To comprehend this complexity, mere empirical analysis would be inadequate, unless it presupposed a unified background and, consequently, certain determinate empirical units (the individual *Umwelten*) which can be identified and analyzed in their singularity precisely on the basis of that background. It is on the basis of identity that, for Uexküll, the unfolding of differences can be understood and justified. But on what does that identity depend?

4. *The Idea of Nature and Transcendental Biology*

If we have thus moved beyond the standpoint of subjectivism and simple empiricism, tracing back to the matrix of the process of becoming-subject, understood as reciprocal action between the organism's original score and its environment, can we claim that it is the primacy of the relation, or of relations, that is at work here? After all, it is a relational dynamic that leads to the determination of subjects and environmental objects. Yet we believe that the notion of relation provides an incomplete answer. Certainly, relational activity precedes subjectivation, but Uexküll, and this is where we believe that his full radicalism as a transcendental philosopher emerges, *does not stop at the level of relations and networks, but takes a further step toward identifying the conditions that make them possible*.

It is true that reality presupposes a formation process that is primarily relational, but there is an idea underlying the relation itself that makes it possible. To get to the heart of the matter, we must clarify what Uexküll characterizes as *Einpassung*. Insertion, or integration, was his response to Darwinian adaptation (*Anpassung*). Uexküll's interpretation of Darwinism is undoubtedly partial and refers chiefly to what he had assimilated from authors such as Haeckel, Roux, and Weismann[51]. When he talks about adaptation and the *Kampf ums Dasein*, what he has in mind is the reconstruction of the condition of the evolutionary

[49] J. von Uexküll, *Umwelt und Innenwelt der Tiere*, cit., p. 58.
[50] J. von Uexküll, *Das allmächtige Leben*, Hamburg, Wegner, 1950, p. 170, my trans.
[51] F. Mildenberger, *Umwelt als Vision*, cit., pp. 42-46.

process through the antagonism among an infinite array of more or less suitable traits, which emerged randomly and survived only if they proved fittest. Yet we have seen that, for Uexküll, the organism-environment relationship does not unfold as a conflict. The life of the organism does not presuppose a hostile environment that would place it in a state of scarcity, forcing it to compete with others for the few available resources[52].

Uexküll's theoretical effort, by contrast, is driven by the opposite consideration: the mystery of harmony, whereby each organism is inserted into its environment like a piece of a mosaic. The orientation of natural inquiry must be recalibrated; one must understand the reason underlying the *survival of the normal* (*Überleben des Normalen*), not that of the fittest[53]. The normal is already complete. To Uexküll, every organism appears perfect and entirely accomplished (*vollkommen*), endowed from the outset with all the means to become «master of its environment»[54]. From the standpoint of environmental constitution and integration, it lacks nothing and suffers from no defects: «every organism can only be itself. But within itself it is perfect»[55]. Perfection, Uexküll warns, here means nothing other than «*the correct and complete exercise of all the means available*»[56].

The organism will therefore never find itself in a state of imbalance with respect to its own vital context, its *Umwelt*. If this were hostile to it, it would not be its environment, and the organism would never have developed there. Rather, it is the surroundings (*Umgebungen*), which also encompass the operational space of less complex animals, that may be unfavorable to it. If there is a struggle for survival, that is waged against the surroundings, not against its own environment[57].

But for such an insertion to be possible, it is necessary not only that there be an *a priori* accord between the individual and the environment, but also that the entire natural world be ordered following an accord among heterogeneous elements incapable of directly communicating with one another. It is not enough to account for individual or species-specific cases; what is required is *a total harmonization* of the individual scores. Indeed, we have already foreshadowed this when speaking of an «astonishing consonance» in the relations between organisms and environments. Such harmonic accord is, in Uexküll's

[52] See, for example., J. von Uexküll, *Die Umwelt*, cit., p. 640.

[53] J. von Uexküll, *Bedeutungslehre*, cit., p. 43; en. trans. p. 185.

[54] J. von Uexküll, *Weltanschauung und Gewissen*, in «Deutsche Rundschau», 1923, CX-CVII, pp. 253-266, p. 266, my trans. Properly speaking, in the biological domain there is no development (*Entwicklung*), but only genesis (*Entstehung*) (J. von Uexküll, *Biologische Briefe*, cit., p. 277, my trans.). Here, too, one can find, as is evident, the main weaknesses of Uexküll's theory: the organism could never be considered powerful enough to radically alter its geographic surroundings (or destroy them), nor would it ever be so weak and disadvantaged as to risk extinction.

[55] J. von Uexküll, *Theoretische Biologie*, p. 138; en. trans. p. 164.

[56] Ibid., p. 137; en. trans. p. 164.

[57] J. von Uexküll, *Streifzüge*, cit., p. 9 n.; en. trans. p. 250; see also J. von Uexküll, *Theoretische Biologie*, cit., pp. 194-197; en. trans. pp. 260-265.

terminology, the *idea*, the *unity of life*[58]. The very variety of the manifold environmental operations attests to its presence, in the fact of the constant recurrence (*die Tatsache der steten Wiederkehr*):

As long as even a single nightingale or spider exists, their song and web will arise from the same life. For life is a unity and consists of interconnected unities, which are at times subjective and at times supra-subjective [*übersubjektiv*]. A supra-subjective unity is also the species. It is the task of the species to ensure that there is always a sufficient number of performers for the various roles in the grand drama of life. Among these roles is that of the prey, as a source of nourishment for other living beings. We can then see what the famous struggle for existence amounts to. It is not a struggle against life, but a scene within life.[59]

In Uexküll's most decisive metaphor, the idea of the *unity of life* is a principle that is neither essentialist nor logical, but *symphonic*:

In the biological world, everything is harmony, everything is melody, for the moments are not there merely to link movements; rather, they accentuate the sensation of content [*Inhaltsempfindungen*] of colors and sounds in complex sequences of pauses, abbreviations, and durations; they dissolve rigid forms [*Gestalten*] into periodically changing phenomena [*Erscheinungen*]. Everything, down to its smallest part, displays order, sense, and meaning. Everything produces a stratified formation [*gesteigerte Gestaltung*], which soon vanishes to make way for the new. Everywhere in the shifting whirl, the end joins with the beginning. A power beyond space and time sustains, moves, and shapes everything – planification [*Planmäßigkeit*].[60]

This *planification* (or *conformity with plan*, or even *design*[61]) is the *a priori* coordination that accounts for all those seemingly innate forms of behavior by which the organism is already able to respond adequately even to situations for which it has no prior experience. *Einpassung* operates simultaneously as the coordination of the organs with the *Funktionskreis* and as the coordination of the animal with its environment[62]. Each repeated sensory experience generates patterns,

[58] This idea, in which we can clearly discern the massive influence of Goethe and Alexander von Humboldt, had already given rise in the second half of the nineteenth century to a daring constellation of monistic doctrines (such as Fechner's panpsychism, as well as Haeckel's own comprehensive vision). With regard to Uexküll, one should not underestimate the reciprocal influence exerted by his friend Hermann von Keyserling, which would merit further investigation (see F. Mildenberger, *Umwelt als Vision*, cit., pp. 92-94). Keyserling, a self-taught philosopher sixteen years younger than Uexküll, had already developed his own idealist and monist system of natural philosophy in the early 1900s (*Das Gefüge der Welt*, München, Bruckmann, dates to 1906, *Unsterblichkeit,* München, Lehmann, followed the year after, while the *Prolegomena zur Naturphilosophie*, München, Lehmann, appeared in 1910). Uexküll's thought reveals far more than a few resonances with Keyserling, well-versed as the latter was in both Kant and Leibniz, as well as in the post-Kantian debate on natural philosophy.

[59] J. von Uexküll*, Das allmächtige Leben*, cit., p. 170, my trans.

[60] J. von Uexküll, *Biologische Briefe*, cit., p. 148, my trans.

[61] See K. Kull, *Jakob von Uexküll: An Introduction*, in «Semiotica», 2001, 134, pp. 1-59, p. 5.

[62] J. von Uexküll, *Die Einpassung*, in A. Bethe *et al.* (eds), *Handbuch der normalen und pathologischen Physiologie*, cit., pp. 693-701, p. 696.

that is, individual units of orientation (composed of all the significant *Richtungszeichen*), which, taken together, always refer back to the organism's *Plan*[63].

The general condition of ecological relationality is thus a non-relational principle. It could not be otherwise, precisely because it is what makes the very relationality of the elements possible. It is therefore an authentically transcendental principle, since it accounts for the conditions of experience without identifying with it and without being conditioned in turn by empirical outcomes. What justifies the reality, in the ordinary aspect of its occurrence, is not simply reality itself, nor is it something that is placed outside it: it is its design, its structure, its inherent plan.

Thus, organisms and environments cooperate for life according to a *universelle Planmäßigkeit*[64]. The latter is the concept that Uexküll himself considered, from the very beginning, the backbone of his theoretical elaboration[65]. Through it, he identifies in life itself the non-sensible principle of the sensible, the immutable and eternal principle governing the formation of individual singularities and their coordination. This is precisely where the process of subjectivation takes place. «Planification is the world-power that creates subjects [*Planmäßigkeit ist die Weltmacht, die Subjekte schafft*]», yet the subject «is not a mechanism arbitrarily placed, but an organism firmly anchored on all sides, forming [bildet] with its environment a uniformly synthesized bundle of active relations»[66]. This passage seems to confirm, if the subject is a product of the idea, that no primacy can be ascribed here either to subjectivity or to the relation with the environment. These remain fundamental structural elements of Uexküll's theory, but the keystone that supports the entire framework is not to be found at that level.

Planmäßigkeit should not be confused with a teleological framework The melody neither predetermines action nor compels it toward a specific goal, nor does it carry a theological significance. It is not a transcendence operating from the outside; on the contrary, it is entirely internal to the organism itself and can also be called its «wisdom» [*Weisheit*][67]. If the original codes correspond, in music, to keys, then each individual plan may be seen as the score for a single instrument, perfectly integrated into the orchestral composition (the universal harmony of life) while retaining sufficient autonomy to be performed solo. To use yet another example from his last systematic work: we see the painter's

[63] J. von Uexküll, *Der Organismus und die Umwelt*, in H. Driesch (ed.), *Das Lebensproblem im Lichte der modernen Forschung*, Leipzig, Quelle & Meyer, 1931, pp. 189-224, p. 205.

[64] J. von Uexküll, *Die Lebenslehre*, cit., p. 156.

[65] And, not without a touch of ambitious naïveté, he hoped it would take the place of evolutionary theories as the primary focus of biology. See for instance J. von Uexküll, *Die neuen Fragen in der experimentellen Biologie*, in «Rivista di scienza», 1908, 4, 7, pp. 72-86, p. 79.

[66] J. von Uexküll, *Biologische Briefe*, cit., p. 281.

[67] «Instead of conformity with plan [*Plänmaßigkeit*], we might just as well speak of conformity with function, or of harmony, or of wisdom [*Weisheit*]. The name does not matter; what does matter is that we should recognise the existence of a natural force [*Naturkraft*], which binds according to rules. Unless we do this, biology is sheer nonsense» (J. von Uexküll, *Theoretische Biologie,* cit., p. 144; en. trans. p. 176).

hand applying colors to the canvas, and at the same time we see the painting taking shape, yet from this complex we remain unaware of the *formative melody* (*Gestaltungsmelodie*). What lies behind the movement of the brush, beyond the sensory data imprinted on the canvas, remains hidden, so that:

> […] a great disappointment awaits us here. The successes of natural technology are plain for us to see, but their melody formation is inscrutable. Natural technology has this in common with the creation of every work of art. We can very well see how the painter's hand put one spot of color after another onto the canvas, until the painting stands finished before us, but the formative melody that moved the hand remains completely unknowable for us. We can certainly understand how a music box makes its melodies sound, but we shall never understand how a melody constructs its music box. That is precisely the question in the creation of every living being. The material is there in each germ cell; the clavier is also present in the genes. Only the melody is lacking in order to complete the formative process. Where does the melody come from? [68]

In this lingering opacity, in the inability of the individual moment to justify the principle of its own existence in its connections with all the others, Uexküll claims to ground a supra-individual principle, which, as the ultimate justification, will in turn admit no further foundation or presupposition beyond itself. Here lies the unity of life: «all these different environments are fostered and borne along by the One», and this One is none other than Nature itself, «inaccessible to all environments forever» and «forever unknowable behind all of the worlds it produces»[69].

This Nature of which Uexküll speaks is not something empirical; it is not observable except, indirectly, in that astonishing harmony of the *whole*[70]. He himself calls it an *idea*, and it is clear that what he has in mind is the regulative use of the ideas of reason he learned from Kant. The idea must hold together the systematicity of science by projecting that principle forward, orienting the scientific enterprise toward finding confirmation of that unity, something that neither the single experience nor the collection of experiences could in any case rigorously demonstrate[71]. We contend that the deep core of Uexküll's the-

[68] J. von Uexküll, *Bedeutungslehre*, cit., p. 58; en. trans. p. 203.

[69] J. von Uexküll, *Streifzüge*, cit., p. 102; en. trans. p. 135; see also J. von Uexküll, *Der unsterbliche Geist in der Natur. Gespräche*, Hamburg, Wegner, 1938.

[70] On the importance of the category of *Ganzheit* in previous German philosophy of nature see at least K. Köchy, *Ganzheit und Wissenschaft. Das historische Fallbeispiel der romantischen Naturforschung*, Würzburg, Konigshausen & Neumann, 1997.

[71] As Brentari arguments: «according to Uexküll the existence of a reality that goes beyond the human faculty of intuition – note here the intentional use of the Kantian term *Anschauung* – is undeniable. Among such realities, life understood in its whole comes into play: our experience necessarily proceeds from the present instant to the next one, and cannot disregard a transcendental structure centered on space and time (which thus establish two fundamental elements of our environment). For the individual rational subject, the phenomenon, including life, is always conditioned; what goes beyond these limits (the noumenon) can be a regulative ideal, but not an object of the environment» (C. Brentari, *Jacob von Uexküll*, cit., p. 105).

ory lies precisely here, and it cannot be reduced merely to a relational ontology or to biosemiotics unless one simultaneously acknowledges the necessity of a singular principle, neither objective nor subjective, that sustains the harmony among individual environments, thereby providing a non-relational ground for relationality. This ground, the *idea of Nature*, is to be understood in its resonance both at an internal level (the harmonization between the organism and its environment) and an external one (between the single monad-bubble and the other monads). For this reason, we propose that Uexküll's theoretical biology can be seen as an undertaking in *transcendental philosophy*.

5. *Prospectives and Challenges of Transcendental Biology: An Ecology of the Modes of Existence*

We have thus reached the point of drawing some conclusions. What significance might Uexküll's approach hold for contemporary ecological thought and for the broader question of the concept of environment and its complex trajectory? The first result is a complete detachment from the image of the world as a global ecosystem, or from the idea of a wholly smooth and uniform nature. The *Umwelt*, as a particular unit determined by the meaningfulness of its relationship with its inhabitant, not only delineates itself with respect to the generic and non-significant geographical proximity of the *Umgebungen*, but also renders the world itself, the notion of *Welt* understood as a totality, irrelevant. The world in this sense, that which is assumed to be 'objective' and which would encompass the totality of abstract experience, is nothing but a fictitious representation (*Vorstellung*). For Uexküll, such a construction, of «an absolute objective world free from any subjective component», if pursued consistently, could only «end in nothingness»[72].

Not only is there no correspondence between *Umwelt* and *Welt*, nor any passage from one to the other, but there are even contrast and incompatibility. In that world, every significant trait of individual experience is subtracted; everything tends toward an indifferent homogenization, to the point that «even life falls outside the objective world»[73]. Where the environment is effective and vital, dynamic, the world amounts to nothing more than a stable set of rules superimposed ex post. Its quantifiability derives from its character as already abstract from the outset, precisely because it is always a model. Thus, *it is the world that is an abstraction rather than the individual environment*. What takes shape in Uexküll is indeed a model for understanding living beings and their relations, but not one based on the reduction of differences to a single operational framework. Rather, it is a model founded upon those very differences: the distinct modes in which each species inhabits and interacts with its unique environment.

This outcome depends on the position of a transcendental principle of harmony. Indeed, the necessity for unity, which might otherwise be resolved in

[72] J. von Uexküll, *Theoretische Biologie*, cit., p. 231, my trans.
[73] Ibid., p. 230, my trans.

the representation of a world-ecosystem where differences are only differences of scale, is instead placed by Uexküll within an idea. This idea does not stand externally (*transcendent*) but is entirely immanent in its regulative *a priori* function, as a condition for all experience (*transcendental*). Its opacity and indemonstrability also fundamentally derive from this position: if the ultimate principle were demonstrable, it would no longer be such. It is therefore, in a Kantian sense, a matter of showing its *quid juris*: empirical observation does not prove the presupposition, such an approach would be logically fallacious, but rather ought to confirm its legitimacy. Thus, it is only this idea of Nature, for Uexküll, that justifies ecological relations, the formation of subjectivity and objectivity, and consequently the individual operations of the situated organism. If this framework were removed, harmony would remain, but it would be entirely inexplicable and contingent. This claim also informs Uexküll's method, which, after proposing fundamental *schemata* of organic functioning (physiologizing Kant's perceptual configuration), can articulate his empirical observations into an ethology of difference. In this framework, there exists a multiplicity of differentiated environments, each with its own peculiarities and its own genesis[74].

Uexküll adds, explicitly, that:

> The consideration of the objective world must, however, never again divert our gaze from the task of reconstructing the universe starting from the environments. For the universe is composed of subjects with their environments, which, through functional circuits, are connected to a whole according to a plan[75].

Behind the multiplicity of environments, there is, in any case, an ideal unity, but this is not the foundation of any global unity; rather, it is merely the invisible accord presiding over the harmonious co-implication of all monads.

A fundamental problem persists, however, one already observed at the time, namely, the substantial limitedness of some of these perceptual worlds, such as that of the tick. This *Umwelt*, constituted in essence by nothing more than three operations, risked, in a solipsistic declension, excluding all relations between different organisms and environments[76]. In such a case, the sphere, rather than

[74] Uexküll's *Umweltlehre* was also in opposition to Haeckel's 'cosmic monism'. Agamben comments that: «where classical science saw a single world that comprised within it all living species hierarchically ordered from the most elementary forms up to the higher organisms, Uexküll instead supposes an infinite variety of perceptual worlds that, though they are uncommunicating and reciprocally exclusive, are all equally perfect and linked together as if in a gigantic musical score, at the center of which lie familiar and, at the same time, remote little beings called *Echinus esculentus*, *Amoeba terricola*, *Rhizostoma pulmo*, *Sipunculus*, *Anemonia sulcata*, *Ixodes ricinus*, and so on» (G. Agamben, *The Open: Man and Animal*, trans. K. Attell, Stanford, Stanford University Press, 2004, p. 40). On the problem of forms and morphogenesis in the biological debate of the 20th century, we refer to the extensive study of M. Tamborini, *The Architecture of Evolution: The Science of Form in Twentieth-Century Evolutionary Biology*, Pittsburgh, University of Pittsburgh Press, 2022.

[75] J. von Uexküll, *Theoretische Biologie*, cit., p. 231, my trans.

[76] Hartmann, engaging with Uexküll just a few years after the latter's death, believed that in his theory the excessive closure of the environment was unable to account for the multiplicity

an invisible and transparent bubble, seems to impose itself as a cage, imprisoning the organism with itself and its own intrinsic limitations. This would risk reintroducing a hierarchy of life forms, and, moreover, an immutable and *a priori* hierarchy. Indeed, if one concedes the solidity of this cage, the result would be the unconditional superiority of those who, from the outset, possessed a quantitatively greater endowment of capacities. According to some interpreters, Uexküll would here fall back into a form of anthropocentrism. Anna Tsing, for example, points out that, while it is true that in Uexküll every animal *makes* a world, less complex subjects such as the tick are excluded, since they are considered solely on the basis of the few perceptual capacities attributed to them[77].

This, in our view, constitutes a misapprehension of Uexküll's fundamental theory, one which rests upon the error of reducing the foundational viewpoint, that of a transcendental philosophy, to the experiential field of the single, empirical individual. The organic individual is indeed limited by its experience; its capacities are, in effect, the limits of its world. Yet this, as we have shown, does not constitute the foundation of the system[78]. Only in light of the idea of a unity of Life, as the ultimate principle for the creation of subjects and environments, does the coherence of the whole become intelligible. Before this unity, which remains not epistemologically accessible, but constitutes a genetic presupposition, all environments are equally complete and every organism is perfect and perfectly integrated. They are on the same plane, because none lacks anything required to be itself. There is, therefore, no hierarchy between lifeforms. By the same token, that solipsistic ban which seemed to keep the windows of the monads closed is dissolved. In reality, they all exist side by side, overlapping and layered «fold upon fold»[79].

and richness of its external vital interrelations that nonetheless occurred within it and toward others (N. Hartmann, *Naturphilosophie und Anthropologie* [1944], now in *Kleinere Schriften*, Band 1: *Abhandlungen zur systematischen Philosophie*, Berlin, De Gruyter, 1955, pp. 214-244, p. 220).

[77] A. Tsing, *The Mushroom at the End of the World: On the Possibilities of Life in Capitalist Ruins,* Princeton, Princeton University Press, 2015, pp. 156-158.

[78] Solipsism, as he writes in a letter to Hans Driesch dated 30.06.1938, is «fundamental», but it is so specifically for the subject and its existence (the letter is reproduced anastatically in J. von Uexküll, *Kompositionslehre*, cit., pp. 93-95).

[79] J. von Uexküll, *Die Einpassung*, cit., p. 700, my trans. Friedrichs develops, based on Uexküll, the idea of a gradation of the *Umwelt*, which we believe can be seen as decisive in the evolution of the concept, both in the Husserlian notion of *Umweltstufen* and in the (completely different) framework of Deleuze and Guattari, where environmental (*milieu*) rhythms communicate with one another and combine into a territorialization (K. Friedrichs, *Umwelt als Stufenbegriff und als Wirklichkeit*, in H. Bauer, L. Curtius, eds, *Studium Generale*, Berlin-Heidelberg, Springer, 1950, pp. 70-74). Nonetheless, even Friedrichs conceived the environment as something external. Most notably if we consider his general definition of *Umwelt* as the «complex of direct and indirect relations concretely apprehensible with the external environment [*Außenwelt*]» (K. Friedrichs, *Über den Begriff der 'Umwelt' in der Biologie*, in «Acta Biotheoretica», 7, 1943, pp. 147-162, p. 157, my transl.).

This framework, it seems to us, legitimates the revival of Uexküll in recent years[80], the study of his relationship with the development of cybernetic and systemic thought[81] and contemporary theories of embodied and situated perception[82]. We believe, however, that another line of inquiry may exist, one which leads us elsewhere from Uexküll. Indeed, what can Uexküll's *Umweltlehre* tell us in light of a broader reflection on environments and our way of relating to them? Beyond a thinking *of* the environment, is there also an *environmentalist* thought in Uexküll[83]?

This is an interesting aspect, as we are tempted to assert that from Uexküll's transcendental biology one can implicitly derive a negative valuation regarding the loss of environments. This is certainly not a moral valuation, that is, the projection of a value judgment onto nature (that is still the most prevalent model of grounding environmental ethics)[84]. Starting from Uexküll, we believe it is possible to interpret the *collapse of environments* as a *collapse of modes of existence*, and thus as a leveling of life in general and a loss of its multiplicity and variety.

[80] In general, on the oblivion and rediscovery of Uexküll's doctrine, see at least F. Mildenberger, *Umwelt als Vision*, cit., pp. 210-38. The appreciation of Uexküll's work regarding the understanding and protection of biodiversity remains certainly valid, even in contemporary times. See M. Tønnessen, *Umwelt transitions: Uexküll and environmental change*, in «Biosemiotics», 2009, 2, 1, pp. 47-64, pp. 53-54.

[81] Uexküll's prompts are manifold in this respect. Consider, for instance, the way he differentiated, in *Theoretical biology*, between the organic and the artificial, without invoking any presumed ontological difference or teleological order. Both have a plan, comparable from an operational point of view, but distinguished according to the heteronomy of the machine, which has an external direction (a 'work director' who does not coincide with the machine itself), and the autonomy of the organic, which directs itself (J. von Uexküll, *Theoretische Biologie*, cit., pp. 199-200). See K. Köchy, *Perspektiven des Organischen. Biophilosophie zwischen Natur- und Wissenschaftsphilosophie*, Paderborn-München-Wien-Zürich, Schöningh, 2003, pp. 274-275; and also the reconstruction of C. Vidales, J. Horta, *A Philosophical and Cybersemiotic Reading of Von Uexküll's Umwelt Theory*, in «Biosemiotics», 2024, 17, pp. 319-339; for the relationship with early cybernetics, see K.Y.H. Lagerspetz, *Jakob von Uexküll and the origins of cybernetics*, in «Semiotica», 2001, 134, pp. 643-651.

[82] Uexküll's theory can be seen as a powerful anticipation of contemporary *4E cognition* (embodied, embedded, enactive, extended). Indeed, his biological inquiry grounds cognition in the organism's physical and biological capacities, foregrounds the inseparable relation with the environment, and radically privileges activity (as functional circle), greatly emphasizing the role of the external and its meaningful interactions with the animal. On the topic, s. at least A. Newen, L. De Bruin, S. Gallagher (eds), *The Oxford Handbook of 4E Cognition*, Oxford, Oxford University Press, 2018. For a point of comparison, it would be interesting to start from analyses such as that of P. De Jesus, *Autopoietic Enactivism, Phenomenology, and the Deep Continuity between Life and Mind*, in «Phenomenology and the Cognitive Sciences», 2016, 15(2), pp. 265-289.

[83] After all, the influence of Uexküll can even be found in the young Arne Næss, founder of the *deep ecology* movement, and in his doctoral thesis, as well as in that of his compatriot Peter Zapffe (M. Tønnessen, *The Relevance of Uexküll's Umwelt Theory Today*, in C. Brentari, *Jacob von Uexküll*, cit., pp. 1-20, pp. 5-9).

[84] As Meyer-Abich noted, the *Umwelt* is in itself neither good nor evil, neither inviolable nor exploitable, it simply exists as a necessary transcendental structure of experience (K.M. Meyer-Abich, *Praktische Naturphilosophie. Erinnerung an einen vergessen Traum,* München, Beck, 1997*,* p. 371).

If we shift again on the plane of relationality, as we have seen, Uexküll offers us an even more interesting insight. Once the *Vorstellung* of a single and unified world, as complex as it is entirely indeterminate, is shattered, what remains are, first of all, precisely the shards: a chain of environmental worlds, of *Umwelten*, in reciprocal relation both with themselves and with others. And behind this *tableaux*, we can glimpse at something more: a first principle of relationality, itself non-relational, which is the principle of Life, as the unitary source of those differences that are irreducible to one another. Here, then, a completely novel model of ecological-philosophical inquiry would open up: an *ecology of the modes of existence* of the individual *Umwelten* and of the conditions of possibility for their relationships.

This would be an ecological proposal far removed from the model of environmental ethics, as well as from that of current scientific ecology and its ecosystemic quantification. This approach might perhaps be developed based on the relationships between the individual determinate activities, around which organisms and their environments are formed, in constant reference to that which permits their development and their co-presence. This line of inquiry could proceed along two distinct planes. The first would involve an investigation into the modes of existence, the nexus of situated capacities that determines how subjects and environments are constituted and integrated within the broader *orchestra* of Life. The second plane would address the peril and the cross-environmental repercussions associated with the collapse of a given mode of existence, its forced disintegration or exclusion resulting from exogenous factors.

In conclusion, we believe that the complex articulation derivable from this approach certainly transcends a mere attempt to interpret Uexküll's thought. What we have sought to demonstrate is that the richness of this theoretical apparatus is not confined to its original elaboration but rather acquires a distinct historical-conceptual positioning and its own trajectory. Herein, consistent with our interpretation, we can rightly assess Uexküll as an «idealist or phenomenalist», as Cassirer had already described him[85]. And we believe that, building upon his work, it is possible to pursue further developments of the

[85] E. Cassirer, *An Essay on Man. An Introduction to a Philosophy of Human Culture*, Garden City, Doubleday & Co., 1944, p. 41. It is interesting to note that, for Cassirer, the specificity of human experience lies precisely in the symbol, in its being *animal symbolicum* and thus no longer merely an animal. For Uexküll, however, this primacy would be meaningless: all animals decode signs, albeit at certainly different levels of complexity. Humans, due to their particular characteristics, including a very high degree of manual dexterity, the use of language, and the variety of stimuli reaching their senses, have a broader range of experiential possibilities, but they do not hold the privilege of the 'outside', of that vertical transcendence in relation to the external world. There is no sharp divide between humans and other animals, but rather a multiplicity of irreducible differences, of which the human is only one among many. The extension of the human *Umwelt* is such that it encompasses, as its own *Umgebungen*, even the environments of less complex animals, thereby rendering them objects of observation. Nevertheless, human sensory experience is not superior or qualitatively better than that of a sea urchin, but different and, if anything, broader solely in quantitative terms. On Uexküll and Cassirer, see B. Van Heusden, *Jakob von Uexküll and Ernst Cassirer*, in «Semiotica», 2001, 134, pp. 275-292.

Umweltlehre along the coordinates we have here reconstructed, potentially offering a bridge between the history of transcendental philosophy and contemporary ecological reflections. What we can discern, at least in its general outlines, is the project, one certainly still to be brought to completion, of what we have chosen to call an *ecology of the modes of existence*.

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– The Transcendental Biology of Jakob von Uexküll: Environment, Subjectivation, and Relationality

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ABSTRACT
The article aims to reconstruct the core of Jacob von Uexküll's scientific project by placing it within the history of transcendental philosophy. Uexküll's fundamental position is thus examined through three guiding theses. The first concerns the subjectivity of the animal and the constitution of its experience in a Kantian sense. The second addresses the question of relation, and namely how Uexküll constructs that experience *ab initio* through a continuous formative exchange between the animal and its *Umwelt*. The final question seeks to justify the very possibility of this relation by introducing a principle that is not itself relational, yet architecturally overarching with respect to individual interactions. This foundational element is Nature itself as an *idea*, ensuring the harmony of the relations between organisms and their environments, continually generating and aligning them without recourse to any transcendent solution. From this reconstruction, Uexküll's work can be critically reassessed and situated as a transcendental philosophy of biology, whose implications for contemporary ecological thought remain far from exhausted.

KEYWORDS
Ecology; Environment; Theoretical biology; Transcendental philosophy; *Umwelt*

SOMMARIO
La biologia trascendentale di Jakob von Uexküll: ambiente, soggettivazione e relazionalità. L'articolo ricostruisce il nucleo del progetto scientifico di Jakob von Uexküll collocandolo nella storia della filosofia trascendentale. La sua posizione viene esaminata attraverso tre tesi. La prima riguarda la soggettività animale e la costituzione della sua esperienza specifica. La seconda affronta la relazione come scambio formativo continuo tra animale e ambiente (*Umwelt*). La terza giustifica la possibilità stessa di tale relazione introducendo un principio non relazionale ma sovraordinato: la Natura come idea, garante dell'armonia a priori tra organismi e ambienti, che le genera e coordina senza ricorrere al trascendente. Questa ricostruzione permette di rivalutare criticamente l'opera di Uexküll come biologia trascendentale, generando implicazioni rilevanti anche per il pensiero ecologico contemporaneo.

PAROLE CHIAVE
Ambiente; Biologia teoretica; Ecologia; Filosofia trascendentale; *Umwelt*