

Uexküllian *Umwelt* as science and as ideology: the light and the dark side of a concept

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Abstract The concept of *Umwelt*, in particular the interpretation originally developed by Jakob von Uexküll, played an important role in the development of biological thought of the first half of the twentieth century. The theory of *Umwelt* (*Umweltlehre*) was one of the most original ideas that appeared in German biology at that time. It was the first attempt to introduce subjectivity into a science about organisms; it laid down the foundations of behavioural research and inspired the development of ethology. However, the theory of *Umwelt* has also been used to support more sinister activities and even some dangerous ideologies. The concept of *Umwelt* is of interest not only to historians: within some intellectual circles, it is still broadly used today. Our aim was to analyse the notion's historic development within the context of biological thought of the first half of the 20th century. In particular, we focus (1) on how the concept was adopted and adapted for various, often widely diverging purposes; (2) on interactions between the *Umweltlehre* and other contemporary worldviews. We argue that in order to understand the developments that occurred in twentieth century biology, one needs to properly appreciate the role which *Umweltlehre* played in these. Even more importantly, the *Umweltlehre* is a worldview that influenced not only science but also politics and social affairs. In this respect it

functioned rather like a number of other scientific and ideological frameworks of that time, such as Synthetic Darwinism.

Keywords Jakob von Uexküll · History of biology · Darwinism · *Umwelt* · Science and ideology

Introduction

What is *Umwelt*? At the end of his book *Umwelt und Innenwelt der Tiere*, the Baltic German biologist and philosopher Jakob von Uexküll (1864–1944) describes *Umwelt* as an impermeable shell that surrounds an animal for the course of its entire life (Uexküll 1928, p. 219). The *Umwelt* of an animal is given as part of the world of phenomena of the observer (*Erscheinungswelt des Beobachters*), and is limited in time, space, and content. The phenomenal world of the observer, however, is also its *Umwelt*, and is therefore subject to the same kinds of limitations as any other *Umwelt*. There is no absolute space and time surrounding all living things. All reality is subjective.

The concept of *Umwelt* is rooted deep in the intellectual bedrock of this continent. In our times, these ideas may seem a weird oddity to some or a refreshing cocktail of unusual ideas to others. But be that as it may, the theory of *Umwelt* (*Umweltlehre*) has more than just a bright side. The development of Uexküll's concept can serve in many ways as a warning. It shows how a way of thinking which at first seemed perfectly harmless can take sinister forms. Especially in consequence of certain of the historical events of the 20th century, some presuppositions of the *Umweltlehre* were used as a tool of a dangerous ideology.

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The concept and term *Umwelt* has acquired many meanings, and has been applied to everything from research concerning subjectivity in philosophy to objective ecological thinking in biology. This makes it an important link between science and philosophy. It is therefore natural that Uexküll's understanding of the concept of *Umwelt* not be forgotten. The modern use of this notion within contemporary biosemiotics has preserved much of Uexküll's original meaning and context (see, e.g., Kull 1998; Kull et al. 2008; Barbieri 2007; Maran 2007; Magnus 2008; Kleisner 2008a, b). We are convinced that in order to use a concept, idea, or method properly, one has to be aware of its positive as well as its negative connotations. It is not our intention to unfairly criticise the theory of *Umwelt* by focusing on some of its unfortunate uses in the past. Theories should not be summarily discarded just because some of their interpretations were misused for sinister purposes. Note that even Darwinian principles were not abandoned because they were once crudely simplified and used unhappily in a social context.

In this article, we investigate how the meaning and use of the concept of *Umwelt* has changed over time. In particular, we focus on the following questions: How did it come about that the concept was applied to widely differing, often conflicting, purposes such as an investigation into the relationship between animals and their surroundings on the one hand, and the racial question on the other? How did the various notions of *Umwelt* interact with the Darwinian paradigm? In what respect was the *Umweltlehre* compatible with the contemporary understanding of Darwinism? Did the concept of *Umwelt* have any impact on the politics and state ideology of the time? How did the concept develop during the period of National Socialism? Is the current colloquial meaning of the word *Umwelt* in German, i.e. to refer to the natural environment, a result of the development this concept has undergone during the first half of the 20th century? The concept of *Umwelt* has split semantically into two very different meanings, one subjective and the other objective. In the following, we show how specific notions of *Umwelt* led to specific theoretical consequences and applications.

Origin and early development of the concept

Uexküll's most important contribution to biology was probably the idea of studying organisms not as isolated subjects but rather as *subjects actively modifying their Umwelt*. The notion of the particular character of the various worlds was, of course, present in the German intellectual arena long before Uexküll's time. It appeared especially in connection with the Romantic tradition. One of the thinkers who inspired German Romanticism (as well

as nationalism), Johann Gottfried Herder (1744–1803), speaks in his *Treatise on the Origin of Language* (*Abhandlung über den Ursprung der Sprache*, 1772) of the 'spheres of animals' (*Sphären der Tiere*)—i.e. every animal has a certain circle (*Kreis*) to which it belongs from its birth, where it remains during its life, and within which it dies. "Nonetheless, it is curious that the sharper the senses of an animal, [...], the more wonderful its creations, the smaller is its sphere." (*Nun ist es aber sonderbar, dass je schärfer die Sinne der Tiere, [...], und je wunderbarer ihre Kunstwerke sind, desto kleiner ist ihr Kreis, desto einartiger ist ihr Kunstwerk*, Herder 1772, Abt. 1). The idea of a close connection between an organism and its environment (a person and 'its' native land and country) was canvassed well before Uexküll, and the same holds true for the term *Umwelt*. The word itself is probably a neologism invented by the Danish Romantic poet Jens Immanuel Baggesen (1764–1826) (Albertsen 1965). It was used to mean the 'surrounding world'; later, it was used to translate the French term 'milieu' but it also entered colloquial language as a term for landscape, surrounding nature, etc. (Sutrop 2001).

Uexküll's conception of *Umwelt* deserves special attention in that it makes the meaning of the term more precise, and makes a contrast with the concept of *milieu* (Uexküll 1936 and elsewhere), which contains an element of environmental determinism and fails to view organisms as subjects. Uexküll and his followers saw the term *milieu* as ideologically (as well as scientifically) unacceptable for a number of other reasons. One important one for them was that the word is of French origin; another one, far more important, was the above-mentioned environmentally-deterministic connotation. This was especially unacceptable during the era of the Third Reich—National Socialism can be treated as an ideology of hereditary determinism when the idea of an all-mighty, mind-and-body-shaping environment was perceived as absurd—as it was for many non-Darwinian thinkers in the pre-Nazi period, Uexküll and others included.

A number of contemporary authors believe that Uexküll was the first thinker to come up with a truly biological theory of the environment, i.e., of a close interconnection between organisms and their environment (Brock 1939; Weber 1937, 1939a, b). Uexküll's approach was in its time widely accepted, within and outside of natural science. (See, for example, Heidegger's use of the term *Umwelt*, and other examples of the use of this term below). Yet, even in the late 1930s, many authors spoke of the *biological* conception of *Umwelt* as if it was something 'newly created' (Weber 1939a; Just 1940). Uexküll himself, however, complained in one of his works that many people used the terms *Umwelt*, *milieu*, and *Umgebung* as if they were interchangeable (Uexküll 1936). In fact, Uexküll's

definition of the term captures in scientific language the Romantic notion of a close connection between an organism and its living environment. A Romantic understanding of landscape, the life it contains, its people, and, above all, of the fateful, deep interconnections between them has been an important part of German culture throughout the course of the 19th century and the 1st half of the 20th century (for other sources dealing with Uexküll's ideas and career, see Mildenerger 2007; Langthaler 1992). That understanding was also often used in connection with holistic theories (Magnus 2008), which too had exerted some influence on Uexküll and his followers.

For example, Friedrich Brock (1898–1958), a long-term student and collaborator of Uexküll, and member of Uexküll's *Institut für Umweltforschung*, developed his teacher's ideas. In 1934, he presented the concept of an organism-*Umwelt*-monad (*Organismus-Umwelt-Monade*), which he saw as crucial in the development of a (then) new scientific discipline, *idealistic biology*. This monadic unity is always integrated and perfect—that is to say, it should be seen that way. It is not necessarily based on one individual animal subject: the subject can also be a higher unit, such as an animal kingdom, race or species (Brock 1939). It is obvious that in this theory, the understanding of *Umwelt* shifts somewhat towards the meaning of 'environment'. In fact, some confusion around the use of the term *Umwelt* persisted until the 1960s, when the meaning stabilised and *Umwelt* came to mean 'environment' (*Umweltschutz* came therefore to mean 'environmental protection') and the plural form, *Umwelten*, disappeared—with the exception of in biosemiotics—from both colloquial and scientific language. Prior to the 1960s, various meanings of the term were often confused (see Sutrop 2001). It was only after WWII, and largely due to the work of the German biologist August Thienemann (1882–1960), that the ecological, or objective meaning of the term started to prevail (see below).

Uexküll and some of the ideological sources of Nazism

Some personal connections existed between the Nazi circles and advocates of the *Umwelt* theory. Uexküll was a close friend of the racial thinker Houston Stewart Chamberlain (1855–1927), Richard Wagner's son-in-law, the man who introduced the Aryan myth into German society. Chamberlain's best-known book, the *Grundlagen des 19. Jahrhunderts* (1st edition 1899, in English published in 1911 as *Foundations of the Nineteenth Century*) became an important point of reference for the German racial sciences and for racial hygiene. That book explicitly supported the Aryan myth and thereby also certain aspects of the German Nazi movement. Uexküll himself was a racialist (which at

that time was not exceptional), and he propagated and advocated Chamberlain's thoughts. In his works, we find enthusiastic references to and word-by-word quotations from Chamberlain's works (Uexküll 1913, 1933 and elsewhere). Still, what Uexküll liked about Chamberlain's thinking was not so much the racial theory, Aryanism, or anti-Semitism: it was Chamberlain's 'biological world-view' (*biologische Weltanschauung*) which won Uexküll's admiration. The two thinkers were connected not only by warm friendship but also by a shared anti-Darwinian stance. Neither of them accepted the idea of a gradual development of species,¹ and they both saw Mendel's laws of heredity (i.e., the permanence of traits) as a convincing refutation of the theory of the gradual formation of the species. After Chamberlain's death, Uexküll edited Chamberlain's only book that dealt exclusively with biology, the *Natur und Leben* (1928): in effect he completed the book, as its author died before he could finish it, and left only fragments. A detailed analysis of Uexküll's relationship with Chamberlain is found in Mildenerger's biography of Uexküll (2007).

In the context of Uexküll's otherwise mainly biological works, it is rather difficult to interpret his book *Staatsbiologie* (1920, 1933), where Uexküll fully adopts the contemporary notion of a 'corporate state' and describes the state as an organism. He writes: "A state is an organism, and if we want to understand it, we need to see it as such" (Uexküll 1933, p. 59). The idea of a state as an organism with its own metabolism and physiology, as well as illnesses and parasites, was often reflected in the language and practice of the Third Reich. It is found, for example, in the frequent use of the term *Volkskörper/Staatskörper* (the body of the nation/state); many biologists and medical doctors who were Party members saw themselves as *Volksärzte* (doctors of the nation), and 'diseased organs' and 'parasites' were to be removed from society. In his book, Uexküll even speaks of *Staatsumwelt* (*Umwelt* of the

¹ Chamberlain, for example, commented in his *Natur und Leben* on Darwin's work as follows: "So far, no gradual change of species (variability) has ever been observed; Darwin's own observations of phenotypically very variable pigeons have shown that even the most enormous differences—which seem to change the whole being of the animal—disappear after a few generations, and what we are faced with is once again the same wild pigeon if artificial selection is abandoned. Darwin does come up with smart arguments to convince us [...]—that, in short, a living form is to him a piece of wax, which can be turned by external conditions into anything one could wish. Here and now I do not feel like starting a campaign against Darwin—that Darwin whose arguments I hold to be so wrong—I only wish to show that a real transformation of one living form (*Gestalt*) into another has never been observed even though many people tried to make it plausible using various arguments" (Chamberlain 1928, p. 41). Note how strongly Chamberlain's (as well as Uexküll's) refusal of Darwinism resonates with his negative standpoint towards the idea of a *milieu*.

state), made up of a hierarchical organisation of individual *Umweltzellen* (cells of the *Umwelt*), that is, the characteristic *Umwelten* of particular functional units of the society (such as professions and occupations). The main function of a state is to care for the *Umwelten* of its ‘cells’: to extend them by the application of science, and harmonise them by art. Fully in accordance with the contemporary image of the ideal national state, Uexküll believed that a state should consist of one nation, while people of other nations or races can attach themselves as symbionts. Sometimes, however, members of other races make use of their host’s illnesses and become parasites:

The situation is different in the case of parasites. [...] They persist in their efforts to undermine national feelings in any way available, and keep on pointing out any shortcomings of the state. All the while, they try to find a thousand and one excuses for some intervention by enemies. They avoid any sort of sacrifice, which puts them in an advantageous position in their aim to use any weakness of the state and gain better positions for themselves. *This soon reveals them as parasites, and finally, when the state regains the strength to resist, they will be eliminated* [italics added] (Uexküll 1933, p. 73).

Another danger a state faces is the accumulation of members of another race in one of its organs: “And even against a congestion of its individual organs by members of another race a healthy state will defend itself. [...] No one can then hold it against the leader of a state (*Staatsleiter*) when he cuts short such excessive influence of a foreign race in state organs” (*idem.*).

Uexküll never mentions any particular race but a brief glance at various contemporary pro-Nazi publications suggests that the derogatory appellation of ‘parasites’ was almost exclusively used in reference to Jews. The idea of the over-representation of a ‘foreign race’ in certain state and social bodies—in particular, the relatively high numbers of Jewish bankers, politicians, and university professors—was also a very important theme in the contemporary anti-Semitism. Moreover, the chapter on the parasitic illnesses of society is absent in the first edition of the *Staatsbiologie*, and appears only in the edition which appeared in the crucial year of 1933.

One should not, however, suppose that Uexküll accepted Nazism as such, and the same holds true for his attitude to anti-Semitism (see Mildemberger 2007). Not all contemporary thoughts should be labelled ‘Nazi’: Nazism was an explosive mixture of contemporary views which coalesced to form a sinister whole at a fateful point in history. Uexküll’s views on the Nazi regime were apparently rather conflicted and were overall not very sympathetic. It is, however, true that some pro-Nazi

authors quoted and praised Uexküll and his work. The concept of *Umwelt* was, as we have yet to see, frequently ‘used’ (or perhaps ‘abused’) by the politicising biologists and theoreticians of National Socialism. That much is clearly evident from the work of some of Uexküll’s colleagues and students as well as the writings of various pro-Nazi scientists and thinkers.

The research into *Umwelt* and the doctrine of *Blut und Boden*

Alongside research into *Umwelt* but on a platform of political ideology, various *völkisch* movements with ‘environmentalist’ goals started to flourish in the early 20th century. They continued the nationalist tradition of Romanticism, and invoked images of agrarian idylls. What united these movements was their admiration of the countryside, village life, nature, various neo-pagan cults, and the veneration of weather- and war-hardened Germanic ancestors, as well as mistrust of cities and urban life, technology, and universalistic civilisation. This aesthetic taste later found manifestation in the Nazi doctrine of *Blut und Boden* (‘blood and soil’), which was based on a policy of agrarian reform with ideological implications. The phrase *Blut und Boden* probably appeared for the first time in Oswald Spengler’s *Untergang des Abendlandes* (1922) in the chapter *Völker, Rassen, Sprachen*, which deals with the importance of race (*Blut*) and the environment in which it arose (*Boden*). There, Spengler writes: “But on which side do such traits stand [which change in the course of development] in that fight of blood and soil which decides the inner form of a ‘transplanted’ animal or human species?” (Spengler 1998 [1923], p. 708). The image of a biological/mystical connection between a nation and its territory was used by one of the foremost ideologues of Nazism, Walther Darré (1895–1953), Reich minister of agriculture, Führer of the Reich’s farmers, chief of RuSHA (Head Office for Race and Settlement), and patron of an obscure research society, the *SS-Ahnenerbe*.

The doctrine of *Blut und Boden*, based on the alleged ties between a racially pure population and its native soil, gradually permeated almost all areas of life in the Third Reich including biological research. In the 1920s, numerous authors suddenly discovered important connections between the ‘organism-*Umwelt*-monad’ and the *Blut und Boden* doctrine. But their interpretation of the concept of *Umwelt* had little to do with Uexküll’s understanding of it. For example, Karl Friederichs (1878–1969), one of the most prominent ecologists of the Third Reich, studied among other things the tree-destroying insects in occupied Poland (see below). In his holistic articles he also touched

upon the relation between nature and a nation (*Volk*), and invoked Uexküll's notion of *Umwelt* (Friederichs 1937).² Even though Friederichs was personally and intellectually closer to August Thienenmann, Uexküll's rival in the construction of a biological *Umweltlehre*, he saw Uexküll as his scientific inspiration and a true pioneer of a biological conception of *Umwelt*. He himself, however, used *Umwelt* mostly to mean just 'environment' in the sense of the external world, thus following Thienenmann's definition, according to which *Umwelt* is synonymous with a 'biotope' or even 'milieu'. Even so, he infused the term with a degree of mysticism. Friederichs saw in ecology the pinnacle of synthesis of the natural sciences, a "total worldview [...] where everything is connected with everything else, everything exerts a direct or indirect influence on everything else, and at the same time, everything is in flux" (Friederichs 1934, p. 281). He thought ecology had the potential to influence all areas of life, including "the movement of care of one's native land (its nature) and its protection, urban development, nation as a community,³ economy as an organism, etc." (Friederichs 1934, p. 282). Friederichs posits a harmony between an organism and its environment, a regional determination of each and every animal, and a "dependence of every race on soil and atmosphere" (see Deichmann 1992, p. 137). When we consider his presupposition of a harmonic relation between people, landscape, animals, plants, and their local rootedness, it comes as little surprise that some years later he wrote: "Such efforts on the part of an ecologist would be, however, useless if they did not conform to contemporary trends, especially the political ones" (Friederichs 1937, p. 86). A few pages further on, Friederichs describes ecology as a "theory of blood and soil" (*Lehre von Blut und Boden*) (Friederichs 1937, p. 91). We find similar statements of endorsement in August Thienenmann's work (see, e.g., Thienenmann 1941; on the relations of holistic ecology, conservationism and blood and soil ideology, see e.g. Potthast 2001; Uekoetter 2006). It is quite clear that such ecological theories adopt from Uexküll's sense of *Umwelt* mainly its holistic element, and neglect its subjectivism. That does not mean, however, that no traces of

the subjectivist aspect of *Umwelt* are found in contemporary literature. The opposite is true.

Perhaps the best expression of a connection between the concept of the organism-*Umwelt*-monad and contemporary politics is found in the work of the entomologist and ecologist Hermann Weber (1899–1956), who introduced his contribution to a gathering of lecturers of the Reich University in Strasburg with the following words:

The conceptual interconnection between an organism and its environment (*Organismus und Umwelt*), which is the topic of this evening, means in the language of biology nothing else than 'blood and soil' (*Blut und Boden*) in the language of politicians. It is not, therefore, an antithesis but rather an expression of a close relation, of natural necessity and law-like connection of these two very complex structures. Just like an organism is adapted to its *Umwelt* in its form and function, its entire existence, creation, and preservation depends on the surroundings (*Umgebung*), contained in this *Umwelt* [...], so too is *Umwelt* a relational term, definable only in relation to some particular organism which sets apart its *Umwelt* from particular surroundings (*Umgebung*) using its specific organisation as well as its species- and race-specific abilities. (Weber 1942, p. 57)

A few sentences on, Weber refers to Uexküll's notion of *Umwelt* and his *Umweltlehre*, as the idea that an organism actively creates its *Umwelt* from its surroundings. However, he criticises Uexküll's subjectivism—the notion that "all reality is but a subjective phenomenon" (Uexküll 1928, p. 2). In order to contribute to the 'Nation and State', one needs in Weber's view an "inner unity of a Weltanschauung". Only such unity can "close the gap between ideas and existence", which has been "weakening German mental readiness to fight for centuries" (Weber 1942, p. 57). Weber analyses the possibility of a synthesis of some traditional scientific disciplines with a strong tradition in Germany—that is, morphology and developmental physiology—and modern theories of heredity. For this purpose, he demands that the idealist typological method, which he sees as connected with subjectivism, be abandoned (Weber 1942, p. 62).⁴ In Weber's view, the Archimedean point from which German biology could be re-built is found in the phylogenetic method and selectionism, which he views as objective. The fact that an organism can survive in its environment is not a consequence of a plan (as Uexküll thought) but rather of selection. The same holds for the 'adhesion' of *Umwelt* to

² His understanding of the term is in fact closer to the *Lebensraum* of Friedrich Ratzel (1901). After all, even Thienenmann's use of the term is synonymous with *Lebensraum*, and the same holds for almost all contemporary ecological writings. Mildenerger (2007) sees Uexküll's *Umweltlehre* as closely related to Ratzel's Darwinist conception. This, as we show, is true of the framework of their ideological implications but not of their intellectual sources or conclusions derived from them.

³ Friederichs here mentions 'community' (*Gemeinschaft*) as a hint towards *Lebensgemeinschaft*, that is, biocoenosis. The term *Lebensgemeinschaft* was frequently used by the contemporary biology of culture (see below).

⁴ It should also be noted that Uexküll's *Umweltlehre* is based on a typological method. *Umwelt* itself is seen as a *typus*, an ideal image based on numerous particular observations.

its (natural, ideal) surroundings. The relation between an organism and its *Umwelt* (environment) is of crucial importance for phylogenesis (Weber 1939a, p. 640).

After 1937, Weber systematically tried to broaden Uexküll's definition of *Umwelt* (ethological and physiological), which he thought to be too narrow, and to extend it to other areas such as ecology, economy, racial science, and genetics. In these efforts, he also diverged from Thienenmann's and Friederichs' understanding of the term. In 1939, Weber published an article on the 'Biological Concept of *Umwelt* and Its Use' in the journal *Der Biologe* (Weber 1939b). In this work, he advocated a broad adoption of Uexküll's theories (as adapted by himself), and drew attention to an affinity between these theories and contemporary political thought. In the same year, Weber published in the apolitical journal *Naturwissenschaften* a long article on the modern use of the term *Umwelt*, where he suggested further possible uses (see above). His most political article is, however, the already mentioned 'Organism and *Umwelt*' from 1942. The core of Weber's criticism (which largely stems from his attempt to make the *Umweltlehre* and *Umwelt* more objective) is in pointing out that the *Umwelt* of an organism includes not only factors which are perceived but also everything that influences the constitution of an organism. Each organism has a "filter, which we call the norm of a reaction," and since this "reaction is species-specific, one organism does not separate from its environment the same influences as another organism." It becomes clear that what Weber calls *Umwelt* is a 'separated system' of 'actuating influences',⁵ which affect an organism (or higher units such as a lineage, race or population) and help it survive.

In the late 1930s, Weber's conception of *Umwelt* found wide acceptance, and some scientists working in the research of mutations, genetics, etc., used it through the 1940s.⁶ We find it used also in the then standard textbook on heredity by Günther Just (1892–1950), one of the foremost racial hygienists and theoreticians: "And so we can say that everything that in humans takes the form of individual and social life is based on a joint operation of heredity and environment (*Umwelt*), that is, the life of a nation (*Volk*) grows out of 'blood and soil' (*Blut und Boden*)" (Just 1943, p. 173).

⁵ Weber (1942, p. 65); similarly also Weber (1937, p. 100) and Weber (1939a, p. 636), where he provides perhaps the most precise definition: "By a (minimal) *Umwelt* one should, within biology, understand a sum of conditions contained in the entire complex of the environment, which enable a particular organism to survive thanks to its specific organisation, that is, which enable an organism in a temporarily limited phase of its development to show signs of life (including propagation) to a degree at least compensating for the mortality of the individual."

⁶ Within writings on genetics, the terms *milieu*, *Umwelt*, and, for example, *Peristase* were used fairly interchangeably.

Even in passages where we would expect the term *Umwelt* to be used in its fully objective sense, that is, meaning 'environment', a space where selection takes place, we often find traces of Uexküll's conception (though it is not quoted explicitly). For example, Otmar Freiherr von Verschuer (1896–1969), anthropologist, geneticist, and director of the Kaiser Wilhelm Institute for Anthropology, Human Genetics, and Eugenics (1942–1945), writes:

Hereditary traits can be reflected in a phenotype only to a degree which the environment (*Umwelt*) permits. The environment (*Umwelt*) can exert influence only to the extent to which there exist [in an organism] hereditary abilities to react. Those environmental influences (*Umwelteinflüsse*), which a hereditary norm of reaction does not respond to, are no stimulus to the animal at all. *Seen from a viewpoint of the organism in question, they are not a part of its Umwelt* [italics by authors]. The genotype (*Erbgut*) thus defines both the extent and the type of a mutual action between an organism and its environment (*Umwelt*). (Verschuer 1941, p. 17)⁷

Verschuer's bifurcated use of the term *Umwelt* was not for his time exceptional. It is probably a consequence of something we have already mentioned: Uexküll's conception, though broadly accepted, and the mutual relations between the terms *Umwelt*, *Millieu*, *Peristase* and *Umsstände*, though often discussed, in the end had to face the notion of 'environment' as understood by the renewed (synthetic) Darwinism based on genetics and the research of mutations. And this branch of biological research did not need to take the subject into consideration. In other words, *Umwelt* also came to mean the space where selection occurs—and Uexküll's notion per definition does not allow for this interpretation, since equilibrium between an organism and its environment is taken to exist a priori.

Kulturbiologie

The idea of a state or a nation being an independent organism, which we find already in Uexküll's above-mentioned *Staatsbiologie*, inspired a new scientific discipline, the so-called biology of culture (*Kulturbiologie*). Its founder was the anthropologist Walter Scheidt (1895–1976). In the 1920s and 1930s, he was first a *Dozent*, then a professor of biology of race and culture at the University of Hamburg (and thus Uexküll's colleague); later, he was appointed director of the Institute of Racial Hygiene in

⁷ It is possible that Verschuer took Uexküll's notion of *Umwelt* into account in a way (and probably indirectly). Yet, in his view, what is crucial in interactions between an organism and its environment is not the *subject* but *genes*.

Hamburg. In the 1920s, he was one of the first anthropologists to use the concepts of population genetics, that is, who abandoned the older idea of permanency and immutability of human races, and instead looked at individual populations from the viewpoint of variability of traits in family lineages as determined by selection. In his book *Kulturbiologie*, which first appeared in 1930 and was later re-published several times, Scheidt focuses on a relation between an organism (but also a nation, state, race, and community) and its environment. Here, Scheidt uses—intentionally and following Uexküll—the term *Umwelt*.⁸ He uses the term in both of its senses, that is both objective and subjective—both the ‘ecological’ and the ‘ethological’ sense; he distinguishes the two, and speaks of a ‘primary’ and a ‘secondary’ *Umwelt* (Schiedt 1930, p. 28). Scheidt was an advocate of Darwinism and the theory of selection. He championed what he called a ‘genetic approach’ (Schiedt 1930, p. 20) not only as applied to individual organisms but also to larger units, which he called *Lebensgemeinschaften*, borrowing a term then commonly used to mean biocoenosis. In his view, both organisms and *Lebensgemeinschaften* are capable of creating their *Umwelt*. They do this in two ways: ‘passive’ creation is a process whereby organisms or *Lebensgemeinschaften* absorb certain parts of their surroundings (*Umgebung*), thus ‘adopting them’. This is the case for both sensory stimuli and various substances such as food. ‘Active’ alternation of environment can be carried out by other kinds of communities, e.g. by cultural ones (Schiedt 1930, p. 45); in this case, *Umwelt* is doubly controlled. For Scheidt, *Umwelt* is a “... relative term [...] which cannot be separated from an animal since it has a meaning only in relation to a particular animal. Otherwise it would be a study of ‘*Umwelt*-environment’ without taking into account what it is that it surrounds” (Schiedt 1930, p. 41).

The *Umwelt* thus created—and culture, both material and spiritual, is a part of it—is also the environment in which selection occurs, a *Zuchtraum* (Scheidt 1939). For example, the *Umwelt* of a culture, that is, the manner in which a culture receives nourishment from its environment and absorbs certain parts of nature—and this, again, applies to both the material and the spiritual aspects of culture—is determined by the typical *Umwelt* of its units, i.e., the racial character of its members.

Equilibrium between the external world and the organism is achieved by an animal (or a larger unit) admitting into its *Umwelt*, based on its inborn reactions, only some parts of the external world (*Außenweltstücke*). This is how

Scheidt sees the process of adaptation (1930, p. 45). In the case of culture, these thus adopted parts of the external world become a *Kulturgut*,⁹ cultural content, which can then be passed on just like a biological adaptation. An illness is defined along the same lines as in the work of Fritz Lenz (1887–1976), a racial psychologist and geneticist, that is, as life on the edge of adaptive ability. Illness is then neither a disease of *just* the organism or *just* the environment: it arises out of their mutual interaction. Cultures, too, can become ill in this way (Schiedt 1930, p. 99)—they can become ‘infected’ by wrong, alien cultural contents, racially alien people, etc. Scheidt’s theory was further developed by Lothar Stengel von Rutkowski (1908–1991), a racial philosopher, biologist of culture, and poet. Stengel von Rutkowski was—like Uexküll—born in the Baltic region, studied medicine, joined the SS in 1938, and eventually reached the rank of *SS-Obersturmbannführer*. He worked at the University of Jena, closely collaborating with one of the most politically influential racial hygienists, Karl Astel (1898–1945), chief of the Head Office for Race and Settlement (RuSHA): the man responsible, for example, for carrying out thousands of forced sterilisations in Thüringen in 1933–1945 (see Hossfeld et al. 2005). From 1944, he occupied several influential positions in Prague, including the German ministry and the local RuSHA, and he was one of the main figures in establishing the racial axis between Jena and Prague (Hossfeld and Šimunek 2008, pp. 80–98; Hossfeld 2004). After WWII, Stengel von Rutkowski occupied himself mainly by writing sentimental patriotic poetry.

Stengel von Rutkowski further radicalised Scheidt’s theory and made it (even) more ideological. He treats nations strictly as biological units subject to natural selection, and describes their development as an almost dialectical struggle between the *Umwelt* (or environment) and the *Erbwelt*, that is, the world of heredity. *Umwelt*, as he sees it, is basically identical with ‘environment’, a *Zuchtraum* (Stengel-Rukowski 1943a, p. 19), where hereditary mutations, selection, and phenotype modifications (*Prägung*) of organisms occur. However, even in this theory, the environment (*Umwelt*) is actively modified by people. It includes not only natural conditions but also human culture, economy, politics, and history. A worldview, *Weltanschauung*, is an integral constituent of *Umwelt* as well; it has both a racial, i.e., biological, and subjective character (see below). An interaction between various components of the *Umwelt* and the *Erbwelt* creates the fate, the *Schicksal*,¹⁰ of each biological unit, that is, also of nations (*Völker*). In the case of a nation, part of its *Umwelt* is its *Heimwelt*,

⁸ Already Sax and Klopfer (2006) described certain connections between the biological/cultural notion and Uexküll’s *Umweltlehre*. In our view, however, an assumption of connections between these two and E.O. Wilson’s sociobiology is not warranted.

⁹ Scheidt puts this notion alongside the *Erbgut*, i.e. genotype.

¹⁰ Which takes us back to the doctrine of *Blut und Boden* as a destined relation between a nation and its environment.

which encompasses its culture, state organisation, religion, and worldview. It is actively created by people, and since *Umwelt* interacts with *Erbwelt*, i.e., with the forces of selection, a community in effect actively creates and modifies itself (Stengel-Rutkowski 1943a, p. 41).

A harmony between the two components, the *Erbwelt* and the *Umwelt*, leads to a stable *Lebensraumgemeinschaft*,¹¹ but such an ideal state of affairs can be disturbed by an infusion of impurity into either of the basic components. It is therefore necessary to stop both an influx of new traits into the world of heredity (racial miscegenation and decline), and changes to the environment, *Umwelt*, which could be altered not only by climatic changes but also by a “mission of ideas or liberalism” (1943a, p. 147). A nation should therefore fully isolate itself geographically and biologically, carry out a selection within itself, and modify its environment in a way that best suits its biological foundation. The goal of this process is to achieve a characteristic *Umwelt* of a nation (*völkische Umwelt*). Such an environment by selection then co-determines the biological composition of the nation which contributed to its creation. This then leads to the formation of a *Zuchtstaat*, a ‘breeding state’ (1943a, p. 33).

We should note that Stengel von Rutkowski shifts the meaning of *Umwelt* towards the sense of objective environment. Only one of its components has a purely subjective character, namely the worldview (*Weltanschauung*). Rutkowski describes this component according to his own political views, i.e., as biologically and racially conditioned, and thus selected for in a particular environment. The *Weltanschauung* of a north European person is in his view a result of the privations and stresses of the harsh northern *Zuchtraum*. Its carriers are thereby conditioned to recognise the laws of the world and nature (Stengel-Rutkowski 1943b). The reason and feeling of a Nordic man make him an efficient inventor and discoverer who “longs to imitate the great order of creation in the order of men” (1943b, p. 9). Other races, made effeminate by their *Zuchtraum* or by abandoning selection due to the influence of civilisation, are incapable of such epistemological feats, and their *Weltanschauung* remains purely subjective. Not so the Nordic race:

We who face the task of securing a victory of values based on race and history, blood and soil, *Erbwelt* and *Umwelt*, the legacy of our forefathers, and work against the passing values of the Christian mission, the French revolution, theory of the other, doctrines of equality and individualistic parasitism, we want, with a clear mind and keen heart to deepen an image

¹¹ This is an odd neologism made of the term for biocoenosis and the then already rather political term *Lebensraum*, used mainly for territories east of the German border.

of the world based on natural laws, and derive from it a worldview which corresponds to life (Stengel-Rutkowski 1943, p. 20).

Rutkowski’s plans for establishing an ‘SS-university’ in Prague, or his own Institute of Cultural Biology and Genetic Philosophy at DKU (Deutsche Karls-Universität), were not fulfilled in the end. Nevertheless, his conception and vision of a racially suitable *Umwelt*, along with his whole “genetic philosophy”, as he called his teaching incorporated in his writings, still had an extensive impact on racial theoreticians and hygienists. Rutkowski was widely known among professional racial hygienists as well as within the SS-structures and was considered an ‘expert on racial matters’. His viewpoints on the relations of *Erbwelt* and *Umwelt* could be considered as a kind of monstrous synthesis of several heterogenous theoretical (as well as ideological) directions as well as the peak of an ideologised usage of the *Umwelt* concept (for more detailed information on Stengel von Rutkowski, see Hossfeld and Šimunek 2008).

Within the framework of cultural biology (a discipline shaped by Scheidt and Stengel von Rutkowski), we see a meaning shift of the term *Umwelt* from the sense in which it describes a world created by a *subject* towards the *objective* factors which create this subjectivity, that is, factors which create an organism without taking its subjectivity into account. Cultural biology thus shifts its focus away from a subject, and the final measure by which a given human group (race, nation, etc.) is judged is its biological success within a given environment. Subjective factors such as an individual’s worldview are merely reflected in this biological success. In the course of the 1930s and 1940s, we can trace this meaning shift in many disciplines of German science which dealt with the environment. Cultural biology was in this sense only a symptom, not the source of this gradual change. It progressed hand in hand with the ‘politicisation’ and ‘mythologisation’ of biology, a process which had gained force at that time.

Racial *Umwelt* and racial psychology

Already Uexküll presupposed that every race has a different *Umwelt* (in his sense). This much follows, for example, from some passages of his *Staatsbiologie*. But the idea that every race, nation, etc., views the world differently is certainly not Uexküll’s discovery: let us just mention Wilhelm Wundt’s *Völkerpsychologie* or Herder’s Romantic notion of *Volksgeist*. We can, nonetheless, suppose that Uexküll’s notion of *Umwelt* fits well with discriminatory racial psychology. Uexküll is in some such

contexts even directly quoted. Perhaps this connection is most clearly expressed by his student and long-term collaborator, Lothar Gottlieb Tiralá (1886–1974).

Tiralá was born in the Moravian town of Brno (Brünn). He studied medicine and biology, and participated in Uexküll's discovery of the mechanism of the movement of the foot in crustaceans (1914). Probably through Uexküll, Tiralá befriended H.S. Chamberlain. He was a devout Nazi, and in 1933 was made professor at the Institute of Racial Hygiene of the University of Munich. He participated in the discussion about the role of homosexuality in a National Socialist state: this issue arose especially in connection with the affair of SA chief Ernst Röhm (zur Nieden 2005, p. 13). After 1945, he worked as a medical doctor, and pioneered a new method of curative breathing. He saw Uexküll as his mentor and as someone who greatly contributed to the creation of the 'biological worldview' championed by Nazi propaganda. On the occasion of Uexküll's 70th birthday in 1934, Tiralá published in the journal *Der Biologe*¹² an article called *Dialog über die biologische Weltanschauung*. There, using the form of a probably fictitious dialogue, Tiralá praises Uexküll (alongside Chamberlain, Haeckel, and others) as one of the foremost pioneers of German 'political' biology. Tiralá wrote several books and articles on issues of race and cultural biology. His most extensive work is the book *Rasse, Geist und Seele* (1935), which deals mainly with racial psychology.¹³ The book received generally positive reviews even though its author fell into disfavour with the ruling regime after 1935. Generally speaking, the content of this work reflects both the spirit of the times and its author's political views. In several places, Tiralá quotes his teacher,¹⁴ and applies Uexküll's notion of *Umwelt* to various human races:

On the other hand, v. Uexküll's *Umweltforschung* could be applied to human races since each race not only differs up to the smallest mental detail but each one also shapes its *Umwelt* in a different way. The *Umwelt* of an Indian, a Jew or a German is firmly established and can be defined by contrast to other *Umwelten* (Tiralá 1935, p. 23).

¹² The entire editorial board joined in with the congratulations on the whole first page of the issue, which included Uexküll's photograph, etc. Surprisingly enough, it was the only congratulation of such a kind printed in the journal during its existence.

¹³ We find an analogical relation to the notion of *Umwelt* also in the works of other racial psychologists (Petermann 1943; Claus 1933). Tiralá is mentioned here (except for his personal relation to Uexküll) rather as an example of someone who held this view.

¹⁴ The most telling evidence for at least Tiralá's relating Uexküll with racial psychology is the fact that Uexküll is depicted together with Chamberlain on the jacket of Tiralá's book *Rasse, Geist und Seele*.

Tiralá uses Uexküll's notion of *Umwelt* much like its author except for one crucial detail. In places where Uexküll would speak of a subject, Tiralá speaks of a genotype (*Erbbild*):

In this place, I would like to point to some key results of J. v. Uexküll's school. They have shown that *Umwelt* cannot be identified with *milieu* in the sense of environment (*Milieu* = *Umgebung*). The *Umwelt* of each organism is created by itself, and this holds for humans as well. And which parts of the external world (*Außenwelt*) a person admits into his *Umwelt* [...] depends on his [...] genotype (Tiralá 1935, p. 149).

Following the political mood of his times, Tiralá completely rejected the possibility of improving people by education, that is, in a non-hereditary manner. He also explicitly states that *Umwelt* is created based on hereditary dispositions: "But also in different races, [the *Umwelt*] varies and cannot be changed arbitrarily by education since everyone builds his *Umwelt* from his surroundings (*Umgebung*) based on his hereditary dispositions" (Tiralá 1935, p. 170).

Even though Tiralá saw natural selection as the key principle of the functioning of nature and society, in some passages he attacks Darwinism and Darwin, and his anti-Darwinian stance bears traces of Uexküll's and Chamberlain's influence. In his *Rasse, Geist und Seele*, Tiralá devotes an entire chapter to a criticism of Darwin's theory (and calls evolutionism a "mass psychosis in science" [1935, p. 204]). That chapter is also almost identical (except for a few added sentences) to the chapter *Der Entwicklungsgedanke* from Uexküll's *Theoretische Biologie* (1928, p. 196ff.). It is surprising that Tiralá criticises Scheidt—who was otherwise very close to Uexküll's ideas—for insufficient biological erudition, allegedly revealed by his separation of the notion of *Umwelt* from the notion of a trait. One might see it as a consequence of Tiralá's rejection of Darwin's gradualism and of evolution theory in general. Following an older generation of German biologists, Tiralá places at the centre of biology a typological 'plan': "It is, however, quite un-biological when Scheidt, out of the blue, wants to treat a trait and *Umwelt* as two separate notions which can be separated only from a momentary viewpoint of the observer" (Tiralá 1930, p. 168).

This close connection between hereditary traits and *Umwelt*, their shared foundation, is in a way the very opposite of what we find in the work of Scheidt or Stengel Rutkowski. Already in Uexküll's understanding of it *Umwelt* does have a certain epistemological component: the *Umwelten* of various groups (both the biological and the social) can be richer or poorer, broader or narrower, or

even fatally unsuitable. In such cases, an organism fails to create its *Umwelt* from its surroundings and perishes as a result. A similarly close relation was also later presupposed between members of various races, ethnicities, social classes, and their environment. For example, K. Gottschaldt, member of the Berlin Kaiser Wilhelm Institute for Anthropology, Human Genetics, and Eugenics, in his 1937 article describes a study of a psychological *Umwelt* based on *Erbpsychologie* (the psychology of heredity). In a series of experiments, 108 subjects of different origin, all of them in preventive custody, were exposed to various artificially created situations which they were supposed to solve based on their genetic abilities (it was a ‘radical live experiment’). Gottschaldt concluded that even in fully identical conditions people react in different ways and interpret situations differently: “Even the situation of a ‘preventive custody’ is experienced subjectively and we find nothing like an objective *Umwelt*. [...] We find as many psychological *Umwelten* as there are structural types and personalities” (Gottschaldt 1937, p. 432).

In Gottschaldt’s view, the role of heredity and the hereditary character of *Umwelt* is beyond doubt, and experiments carried out on identical twins prove it. In 1936, the Kaiser Wilhelm Institute even built for this particular purpose a special research camp for twins (*Zwillingslager*), where large numbers of twins were brought and studied for 4–8 months.¹⁵ In psychology, Gottschaldt saw the old notion of *milieu* as inadequate, and advocated the use of the concept of *Umwelt*, which is related to a subject. He concludes as follows:

In the area of psychology, one should further develop a notion that could be seen as relational, that is, as relating to the hereditary structure of the person who experiences it. Such a psychological notion of *Umwelt* would then be in a way parallel to the concept used in biology, especially by v. Uexküll’s school (Gottschaldt 1937, p. 434).

The notion of *Umwelt* was quite often related to the notion of a ‘world image’ (*Weltbild*) or a ‘worldview’ (*Weltanschauung*). Both of these terms had a racial context (as in ‘Aryan worldview’) but also a political (as in ‘National Socialist worldview’) and an evolutionary-epistemological aspect (as in ‘species-specific worldview’). Within the framework of theories of race, these meanings could be arbitrarily interchanged since race was treated as a

sort of universal foundation from which everything else evolved. Thus even political views were seen as a biologically conditioned ‘manual’ for the structuring of society and personal life. It seems that this framework was also fully adopted by Fritz Lenz (1887–1976), co-author of possibly the most influential work in the field of racial hygiene and eugenics, the *Menschliche Erblehre und Rassenhygiene* (first edition 1921). Lenz was, among other things, Tiralá’s predecessor in the post of director of the Institute of Racial Hygiene at the University of Munich. Later, he left for Berlin where he was appointed director of the Department of Racial Hygiene of the above-mentioned Kaiser Wilhelm Institute for Anthropology, Human Genetics, and Racial Hygiene. Lenz’s specialisation, that is, racial hygiene and *Erbpathologie* (pathology of heredity) made him one of the most quoted geneticists in a broad spectrum of literature on race. In the chapter ‘Race and Heredity’ of the above-mentioned classical work (often quoted as just Baur-Fischer-Lenz or BFL), Lenz writes:

These days we often hear and read about a ‘species-specific worldview’ (*arteigene Weltanschauung*). What we mean by a species-specific worldview is, however, not something characteristic of humans as a species but rather something characteristic of particular races, that is, something innate or genetic.

And a little further:

In some ways, the world looks different from the viewpoint of each race; and that is also why none of these viewpoints can be correct, since [if that was the case...] it would imply a relativisation of all knowledge, and thus amount to giving up on the concept of truth and world.” (Baur et al. 1936, pp. 770, 772)

To Lenz—and millions of readers of his books—“worldviews [...] are, from a biological point of view, tools in the struggle for survival and in the struggle for power” (Baur et al. 1936, p. 770). L.G. Tiralá thought of worldviews in a similar vein: “Biology showed us that the *Umwelt* of every living creature includes a specific character of its reactions to stimuli. So too our worldview is an essential expression of the Germanic racial soul and is of vital importance.” (Tiralá 1935, p. 239)

Weber’s above-mentioned article from 1942 can be seen as one of the last attempts to clarify and stabilise the notion of *Umwelt*. We also read here that organisms (including humans) aim at stabilising their *Umwelt*: both their ‘objective’ *Umwelt*, where factors such as temperature, metabolism, etc., can be regulated, and their ‘subjective’ *Umwelt*, which can be regulated by endogenous instinctive activities. Unlike most species, humans can also actively modify their *Umwelt*-environment by purposefully and intentionally transforming their surroundings (*Umgebung*).

¹⁵ An entire book (Fischer and Gottschaldt 1942) is dedicated to this subject. Gottschaldt writes in the introduction that the whole department of hereditary psychology was founded at the instigation of Eugen Fischer, and he was responsible for much of the research. The book also contains an extensive passage on the issue of *Umwelt* in genetics and psychology (pp. 74–93).

People thus in fact artificially create their natural *Umwelt*, and ‘replant’ (*verpflanzen*) its subjective elements into the objective ones. According to Weber, this far-reaching stabilisation of *Umwelt* led many to believe that humans do not, in fact, have any *Umwelt* in the proper sense of the word. Weber rejects this assumption, and claims that one should rather speak “not of [an *Umwelt*] of humans as a species but rather just its particular races, tribes, and persons” (Weber 1942, p. 67).

This also implies that various races are by their *Umwelt* adapted to different kinds of environment (which they also actively modify), and are thus even more subject to selective forces of the external environment. That is why Weber sees “the attempts of liberalism and its offspring to liberate human life, especially spiritual life, from its ties to conditions given by the environment and the even more apparent influences of heredity [...] which result from it, as one of the gravest mistakes in human history” (Weber 1942, pp. 67–68). People can actively modify their environment “but their genotype (*Erbgut*), their characteristic organisation, and therefore also their ability to actively and systematically create their *Umwelt* [can be changed] only by *selection and elimination* (*Auslese und Ausmerze*)” (ibid., italics added). The *Umwelt* of a race, that is, its *Weltanschauung*, is given and cannot be manipulated in any other way than by altering biological heredity.

Discussion and conclusions

In the 1930s and 1940s, the notion of *Umwelt*, in the sense of a subjective world around each particular organism, clearly underwent some crucial changes. It was subjected to protracted discussions not only within scientific circles, where the controversy ran across various fields, but also within the world of politics and ideology. The meaning of the term commonly used in the language of today, that is, ‘natural environment’, is closely connected with the semantic shift which occurred at that time. The notion of *Umwelt* had often been identified with the older concept of *milieu* and its related context, that is, ‘surroundings’. Its interpretation was hotly contested in epistemology, and some theorists favoured a psychological interpretation of the term (something which Uexküll himself opposed). In the prevailing interpretation of that time, the subjectivity of organisms was replaced by ‘hereditary traits’. The term was frequently used but its precise meaning often remained unclear. Some authors therefore preferred using other terms, such as *Milieu*, *Peristase*, *Umstände*, or felt it necessary to provide their own definition. In the late 1930s, two interpretations of *Umwelt* seem to prevail: one ‘objective’, in the sense of a space within which selection occurs (in this sense it was used by geneticists,

evolutionary biologists, and racial anthropologists), and the other ‘subjective’. The latter sense was close to the notion of a worldview, but some biologists related it to the ‘norm of reaction’ (*Reaktionsnorm*, Woltereck 1909) (see, e.g., Weber 1942).

In the work of most of the authors here mentioned the term is rarely used to mean one of the extremes. The shift in meaning was rather gradual; various conceptions often overlapped, sometimes even intentionally; and this lack of precision, this nebulousness, was often driven by ideological rather than scientific purposes. We can assume that this confusion of meanings is closely connected with a shift in biological thought which occurred in the 1930s, namely with a ‘resurrection’ of Darwinism, which managed to integrate with the seemingly incompatible Mendelian theory of heredity. This element which came to prevail was at first rejected by many scientists, proponents of the German typological tradition. Various ‘transitional forms’ also existed, and we have mentioned some of them.

The issue of the two meanings of *Umwelt* probably arose in the course of various attempts at some sort of synthesis of selectionism—where what selects is the environment, and one of the terms used for that was *Umwelt*—with ‘traditional’ areas of German biology including Jakob von Uexküll’s *Umweltlehre*, where *Umwelt* functions as a relational term. The integration of *Umweltlehre* and selectionism on the one hand answered the question of how a (subjective) *Umwelt* might be created: it arises by selection under particular circumstances. On the other hand, however, it opened the issue of differences of *Umwelten* not only between different kinds of organisms but also within the human species. *Umwelt* thus gained a racially-epistemic dimension. If each race develops in a different environment, its adaptive *Umwelt*, its image of the world, must also be specific. And moreover, if there exists a racially characteristic environment, people are tied to it because that particular environment best fits their worldview. It was this frontier between the two senses of the word which gave a veneer of scientific respectability to the most ideologically exalted, Romantic, and mystical idea of a correspondence between the soul of a nation, the landscape, and organisms living within it.

Even though such a synthesis of originally rather different traditions in the end took place, it was not Uexküll’s work that necessarily always inspired it. It may have been caused by the state ideology of that time. One may say that biology, including anthropology, was torn between two contrary directions: on the one hand, it had to keep the appearance of a universal, ‘objective’ science, which aims at describing the ‘immutable laws of nature’ (which did not prevent it from often serving the state ideology); on the other hand, it endeavoured to develop a particular, national character, and express essentially German, traditional

ideas. These pressures, too, were exerted by the state ideology—but by its different, ‘anti-modernist’ aspect. Uexküll and his notion of *Umwelt* therefore posed something of a dilemma: he developed a quintessentially ‘national’ biological theory, which had applications in many contemporary sciences, but he also represented idealistic, vitalistic, and holistic tendencies in biology. These were not favoured by SS structures and in many official places they were looked at with increasing distrust (Harrington 1999).

Within the various racial doctrines, this change reflected a shift in the thinking of some race theorists who turned away from the concept of race as a static, constant, *typological* unit, and adopted a synthetic concept, within which race was seen as a particular group changing in space and time. After all, if race was immutable, eugenic measures would not make any sense. The new German synthesis was rather closely connected with the development and ‘progress’ within German racial hygiene and its allied fields (Hossfeld 2000; Weingart et al. 2006). In some respects, one could claim that the misguided practical applications of this synthetic theory to humans were one of the cornerstones of German Nazi ideology and were directly related to its consequences, including forced sterilisations, euthanasia programmes, bans on racial miscegenation, ‘population policies’, and attempts at positive eugenics as seen in projects such as *Lebensborn*.

In conclusion, we can point out one rather common phenomenon; that is, how the increasing ideological load of the term *Umwelt* led to the disappearance of a ‘subject’, a particular organism to which the notion was originally related. On the one hand, the notion extended to the broad ‘space’ or ‘environment’, and on the other hand, it was replaced by talk about ‘genes’. Totalitarian systems—not only in politics, this holds for all orthodoxies—tend to assume that organisms, and humans above all, are predictable, and that their behaviour can be fully analysed in terms of systematic reactions to external stimuli (society) or purely innate hereditary abilities. In neither of these ways of thinking can a ‘subject’ play any role.

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