

Schema as both the key to and the puzzle of life: Reflections on the Uexküllian crux

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Abstract. Jakob von Uexküll's problematic is manifested in his paradoxical portraiture of form within the plan of nature: the one a sensual schema and the other a transsensuous ideal form. At first sight, Uexküll's belief in the Platonic and the Reformational notions of the immobile becoming of form seems to be a resignation from the heated debates among his contemporary materialists, vitalists, dynamists, and evolutionists. However, in terms of the Kantian subjective teleology, Uexküll's appropriation of the ancient philosophy reinstates the invisible, static, but repetitive cycle as his regulating principle in the observation of the activity of animals. This regulating principle distinguishes itself from the rule of resemblance established by the appearances and fossil remains of animals, which is linear, incomplete, and digressive. In the light of Michel Foucault, the transition from the visible to the invisible recoups the study of nature from the living beings (*les êtres vivants*) to the life itself (*la vie*), from natural philosophy to biology. My study suggests that we recast Uexküll's sign theory from his observations on the crux that models and triggers an animal to action in its *Umwelt*. Bracketing Uexküll's transcendental configuration of form and image, we still find that schema, in its sensual and functional context, evolves from a reflection of the objects to a summary of their features plus an ignorance of their proper names. Uexküll's erasure of proper names (in different languages) that directs our attention to the presentation in its pure form (*Gestalt*) not only constitutes an important step in epistemology, but also in a life science that meticulously delves into the genotypes.

1. The changing shape as a problematic

In his observations of the phenomenon of life, Uexküll bridges two seemingly irreconcilable but necessary states — constancy and change. He attributes constancy to the structure of the organism and change to its protoplasm. Sometimes he describes the organism as a well-built machine, but, more often than not, the organism appears to us as an intelligent being, which knows how to lead its life. From the Uexküllian perspective, an amoeba under the microscope and the clouds floating in the sky are not very different. Uexküll projects the functional circle to them both, in which the sensitive and reactive organisms take different shapes during their incessant interactions (*die Wechselwirkung*) with the food and the wind. The changing shapes (*die wechselnd Formen, die Formbilden, die Gestalten*) offer an index to life; however, each change is not random but already invested with a command, a purpose, and a meaning.¹ Both a machine and an organism are constrained by their innate commands during the course of their lives (*Zeichenprozesse*). One of the essential tasks of *Umweltforschung* is to explore the centralizing command within an organism that attracts only the desired objects, but ignores the undesired ones in its outer world.

Regarding the human subjects' understanding and judgment of nature, it is Kant who devises schema as mediation between the innate a priori categories and the phenomenon. Without the schemata and the sensations, one can see the objects with his given categories, but there will be no understanding and no judgment of them. The schemata coated with sensibility (*Sinnlichkeit*), sensations (*Empfindung, Sinneempfindung*), and the feelings of pleasure (*Lust*) and displeasure (*Unlust*) realize, but at the same time restrict, the human subject's representation of the world.² Uexküll closely follows Kantian doctrine in order to replace the stereotyped conceptualizations of living beings.

¹ Uexküll reinstates the meaningful shape in *Bedeutungslehre*: "The meaningful shape is constant; it is always the product of a subject, and never the product of random influences on an object. [...] The meaning of all plant and animal organs as utilizers of the meaning-factors external to them determines their shape and the distribution of their constituent matter. [...] Until now, we had no reason to infer a meaning-command separate from the form-shaping command" (Uexküll 1982: 37).

² Kant 1996: 276–277.

In his rebuke against the mechanists and the dynamists, he excludes the possibility of unplanned machines from his planned biology:

One might just as well imagine that a simple mechanism came into existence through pure coincidence and remains completely without plan. The same is true with dynamisms. A wellspring, which arises somewhere from beneath the earth's surface, is certainly a dynamic system but completely without plan, while a fountain in a French park is meticulously planned. Thus the question should not be: are living beings dynamisms or mechanisms? One should rather ask: *are they a planned work or a piece work, which is unconnected to any plan* (such as the raindrops in a cloud)? (Uexküll 1980: 128; italics mine — J. C.)³

In addition to the construction plans, which are assumed to be universal in all living organisms, Uexküll distinguishes the unrelated object (*beziehungsloser Gegenstand*)⁴ from the meaning carrier (*Bedeutungsträger*). An organism without a plan is analogous to a human subject without schemata. However, Kant's anthropocentric speculation of schema is rather metaphysical, which is not identical with a structure or even something substantial in the human mind. Aiming to pick up the tradition developed by Plato and Kant, Uexküll has transferred and located this enabling but restricting magic of schema in animals. How did he make the breakthrough to prove his teleology that all animals, regardless of their levels in the man-made classificatory system, are equipped with schemata?⁵

³ Uexküll highlights the idea of blueprints in all living organisms when he refines the borderline between physiology and his biology: "Mechanismus irgendwo durch Zufall entstanden ist und völlig planlos bleibt. Das gleiche gilt von den Dynamismen. Ein Springell, der irgendwo dem Erdboden entsteigt, ist gewiß eine dynamisches System und dabei planlos, während die Springbrunnen eines französischen Parks planvoll abgestimmt sind. Die Frage muß daher nicht so gestellt werden: Sind die Lebewesen Dynamismen oder Mechanismen?, sondern sind sie Planwerk oder Stückwerk, die durch keinen Plan verbunden sind (wie die Nebeltropfen in einer Wolke)?"

⁴ The 1982 translation of *Bedeutungslehre* says: "The stone lies in the objective observer's hand as a neutral object, but it is transformed into a meaning-carrier as soon as it enters into a relationship with a subject" (Uexküll 1982: 27). Regarding the object, Uexküll actually holds a completely negative tone in the German text; he says "Der Stein, der als beziehungsloser Gegenstand". I therefore translate the key term as "unrelated object".

⁵ For the 4th volume of *Symbolic Forms*, Cassirer keeps some notes about his discontent with Uexküll's use of schema in animals. He says: "[Uexküll's

2. The theoretical evolutions of *Schema* and *Umwelt*

Before Uexküll had his book on *Umwelt und Innenwelt der Tiere* published in 1909, he spent at least seventeen years observing the muscular contractions of invertebrates and marine animals, the so-called model organisms. Uexküll's illustration of Schema in this work is much more controversial than his use of Umwelt; the former promptly caused disagreements among the empirical scientists at the time, while the latter still stays within the ordinary notion of the outer world or the environment of an animal. In his 1911 reply to a letter from Ernst Mach, Uexküll says:

I cannot get over one point, which is about your rejection of Kant. For me personally, I do not understand the theory of things in itself as much as you do. I think it is a purely marginal concept, with which certain things would be dismissed and it does not help us understand anything. On the contrary, Kant seems to me, as correctly as you do, to observe the sensations as the materials, from which the world constructs itself. I particularly have a high regard for the chapter on the Schematism of Pure Understanding, which shows how the materials of sensation [*dies Empfindungsmaterial*] can be formed as enactive objects [*Gegenstände*] through the schemata. *I think many of your research results can also be developed with this process.* (Uexküll 1978: 135; italics mine, J. C.)

Mach, as a follower of Fechner and the pioneer of the Vienna Circle, presented a series of psycho-physical analysis of human sensations between 1900 and 1911 (Thiele 1978: 124; Mach 1998). His project adopted “the principle of the complete parallelism of the psychical and physical,” in which the reduced amounts of psychological elements are equal to the expected amounts in the nerve-processes (Mach 1998: 30). Except for Mach's rejection of the metaphysics, Uexküll, in this letter, is not strongly against Mach's physical approach because he suggests that schematism and parallelism can enlighten each other. He even conveys his admiration to Mach by complementing Mach's original detour from the traditional approach of atomism, which, he

‘Gegenwelt’] conceives the schema all too narrowly as an image, as a spatial schema”; “Animals do not possess such a view as nonperceptual representation.” He believes that the human beings become animal-like only under pathological conditions, like agnosia [the inability to name objects] and apraxia [the inability to move] (Cassirer 1996: 214–215).

criticizes, has led biology to a completely dead end.⁶ At the early stage of Uexküll's research, the schema in the philosophical domain was intended as a higher term to bring metaphysics and the empirical sciences together. The schema was also given an anatomical configuration as the "mirror" (*der Spiegel*) that faithfully and completely reflects the objects in an animal's environment (Uexküll 1985: 234). Uexküll believed that an animal reacts to the mirrored image of an object that has already been formed in the animal's eyes. A further centralization of the peculiar mirrors from the retina to the brain forms the counter world (*Gegenwelt*), in which he found the number and types of objects to be correspondent with the given schemata:

I call this central pathway complex, formed in correspondence with the images of the objects on the retina, a schema and assert that the exact number of types of objects in the surroundings is distinguished by the animal as there are schemata present in its counter world. (Uexküll 1985: 240; 1909: 241–242)

The counter world constitutes the fundamental organization (*Ausgestaltung*) or the construction plan of an animal. Uexküll takes it as the focus, from which derives the sense and signification (*Sinn und Bedeutung*) of every species. In contrast to the Darwinian interest in the outer worlds, Uexküll plans to narrow down his scope within the inner worlds and the counter worlds that constitute a minimal source but generate the broadest implications (Uexküll 1985: 224–225). It is the *Innenwelt* and the *Gegenwelt* rather than the *Umwelt* or the *Umgebung* that are charged with high voltage to shift the attentions of the scientific communities:

The comparison of inner worlds [*Innenwelten*] is just as instructive as the comparison of environments [*Umwelten*]. Whereas our own environment

⁶ In the final paragraph of the letter, Uexküll says: "Ich habe es immer sehr bewundert, dass Sie im Gegensatz zur herrschenden Physik nicht aus dem Atom die Weltseele gemacht haben, sondern einen Weg gegang[en] sind, der eigentlich ein biologischer ist und das in einer Zeit, da die Biologie völlig todtgeschlagen war" (Uexküll 1978: 135). My gratitude goes to Dr. Torsten Rüting for discovering this letter during my two-week stay in Hamburg in July 2003. We didn't find the letter from Mach to Uexküll in the Hamburg archive center. Neither did I find any letters between Uexküll and Mach catalogued in the Tartu archive centre when I visited it in mid January 2004, with the kind assistance of its chairperson Riin Magnus and Prof. Kalevi Kull.

[*Umwelt*], which constitutes the surroundings [*Umgebung*; geographical environment] for all animals, is full of colorful, resounding, scented objects, our counterworld [*Gegenwelt*] is limited to the succession of excitations in the prestructured nervous tissue schemata [*nervösen Fasergebilden (Schema)*] of our brain. In their form they resemble those objects. (Uexküll 1985: 242; 1909: 250)

Later manifestations of schema after 1909 still reveal his emphasis on the collaboration between the receiving ends and the commanding center inside an organism. Uexküll's renewed definition of the nervous schemata can be formally traced in his *Theoretische Biologie* (1920), in which he invalidates the theory of psycho-physical parallelism, but embraces the theory of sufficient determinateness or differentiation by Johannes Müller (Uexküll 1926: 146–147; Mach 1998: 28):

Wheresoever qualitatively different stimuli effect an entry, we find that their specific peculiarity is taken from them. Whether an airwave strikes the ear, or an etheric wave the retina, the same transformation is set going in both cases...The various stimuli are not distinguished through different excitations in the nervous system, but by the "person" of the nerves through which they flow...it was discovered by Johannes Müller, who made of it, along with all its corollaries, the basis of comparative physiology of the nervous system. (Uexküll 1926: 147)

Assisted by the metaphors of a scale (*eine Skala*, 1920), some lines (*die Linienführungen*, 1920), and a sieve (*ein Sieb*, 1940)⁷, Uexküll conceptualizes the schemata as several people, who serve to quantify the number of excitations and to control their effects. However, the number of schemata definitely does not correspond to the number of excitations, nor do the schemata reflect the objects in the outer world. The schemata are a "summary" of the features of the objects that are most proper and important to the person:

As soon as outlines serve the body as indications, differentiation of the sensory part of the nervous system speeds off. For now it is useful so to combine quite definite sensory nerves of the eye, that their common or successive excitations are linked up into a whole, which makes its way into

⁷ The 1982 translation of *Bedeutungslehre* mistranslates "das Sieb" (the sieve, the screen) as a gutter (the underground tunnel), which renders Uexküll's idea bizarre: "At the outer boundary, they [sense organs] serve as a gutter for the physico-chemical effects of the outside world" (48).

the guiding mechanism as a new unity. I have called these nervous unities ‘anatomical schemata,’ because they do not give a complete reflection of the outline in the external world, but merely a summary combination of its most important parts, and this with a degree of exactness suitable for the particular animal. (Uexküll 1926: 149)

The Kantian schema is also coined with the reflex arch and the functional circle to illustrate the sufficient content qualities inside the sense organs. Uexküll’s use of *Umwelt* still oscillates between the subjective world and the physical world. Nevertheless, he gives *Umwelt* a greater prominence than his previous work; the *Gegenstand* is refined as the “*Umwelt Ding*” in his elaboration on “*Welt und Umwelt*,” supplemented at the end of the 1928 version of *Theoretische Biologie*:

Now I mark all the surrounding objective realities as the world and all the surrounding subjective realities as *Umwelt*. So it will gradually reveal that the two worlds contradict each other...One had best always start from an individual object and look for it in the different *Umwelten*, [that is,] to have a sense of impression, how he [the impression] dresses himself in hundreds of colors and forms and how he [the impression] becomes first one thing and then the other in the *Umwelt*. (Uexküll 1928: 232)⁸

Umwelt as a theoretical tool gradually outshines the anatomical *Schema* when Uexküll in the 1934 *Streifzüge durch die Umwelten von Tieren und Menschen* distinguishes *Umwelt* from *Umgebung*, the former is constituted by an organism’s reactions to the geometrical shapes while the latter is the objective physical world. On the other hand, he presents some case studies about the fallacy of schemata: they may be broken, dissolved or become incomplete in life situations, due to the lack of established pathways or the traumas inside the

⁸ Uexküll came to Hamburg in 1925, and the *Institut für Umweltforschung* was established in 1926. His specification of *Umwelt* may be attributed to the rise of the new discipline: “Bezeichne ich nun sämtliche mich umgebenden objektiven Wirklichkeiten als Welt und sämtliche mich umgebenden subjektiven Wirklichkeiten als Umwelt, so wird sich Schritt für Schritt zeigen lassen, worin diese beiden Welten sich widersprechen” (Uexküll 1928: 228); “Am besten wird man immer von einem einzelnen Gegenstand ausgehen und ihn in den verschiedenen Umwelten aufsuchen, um einem Eindruck zu gewinnen, wie er sich in hunderterlei Farben und Formen kleidet und bald zu diesem bald zu jenem Umwelt Ding wird...in der Umwelt eines Singvogels, der in ihren Ästen nistet — eines Fuchses, der unter ihren Wurzeln seinen Bau hat — eines Spechtes, der auf Jagd nach die Holzwürmer in ihrer Rinde macht — in der Umwelt eines solchen Holzwurmes selbst.”

animals. The completeness and the sophistication of the nervous systems become an index to differentiate the animals into two types:

It is enough to assume that the receptor cells for local signs in the receptor organ are segregated into two groups, those in one, according to the schema, broken [*aufgelöst*], those in the other, according to the schema, compact [*geschlossen*]. There are no further differentiations. (Uexküll 1957a: 40; 1934: 47)

A dissolved schema is not able to organize the protoplasm or to control the muscles, much less to form an enclosed system. An organism or an animal without the continuous and systematic network is open (*eröffnet*) to the outer world. Its shape of body is subject to constant but blind changes, like the amoeba, the sea urchin, the scallop and the earthworm. The schemata dominate the formation of the counter world (*Gegenwelt*) and the perceptual world (*Merkwelt*). However, the function of the schemata will not be completed without the operational world (*Wirkwelt*). The constant oscillations between triggering and extinguishing (*Das Wirkmal löscht das Merkmal aus*, 1980: 124), selecting and imprinting (*Merkmale, die ihnen vom der Subjekt aufgeprägt werden*, 1940: 57) strengthen an animal subject's "surrounding world" (*Umwelt*; or "rebuilt world" in the sense of *Umbau*), which is a composite of the transformed and abstracted properties of the objects. *Umwelt* as an abstract and theoretical tool achieves its sufficiency in the 1940 *Bedeutungslehre*:

Everything that falls under the spell of a *Umwelt* (subjective universe) is altered [*umgestimmt*] and reshaped [*umgeformt*] until it has become a useful meaning-carrier; otherwise it is totally neglected. In this way the original components are torn apart without any regard to the building-plan that governed them until that moment. (Uexküll 1982: 31; 1940: 7–8)

When Uexküll appropriates *Umwelt* in the sense of ego quality (*Ich-Ton*) rather than the outer world, the Kantian schema becomes merged with the nervous system, the functional circle and the intended sense of *Umwelt* itself. Unlike the multiple properties of an object, the *Ich-Ton* of a subject is much restricted to its time, space and sensations. The problematic lies in how the subject uses his phenomenal world to differentiate his body parts and his perceived world, following a

purpose, a meaning and a melody. The distinctions or gaps between human beings and animals are replaced by a seamless cooperation between the meaning user (*Bedeutungsverwender*) and the meaning carrier (*Bedeutungsträger*).⁹

3. The *Urbild* and the *Gestalt* against evolution: the Uexküll-Darwin controversy

Uexküll as a scientist sounds rational and artistic enough, but he dramatically negates the schemata when he becomes intoxicated over the meaning of life. The metaphysical Uexküll backbites the constructive Uexküll when he adopts the tone of Socratic irony:

But stop! That is not what the spider does at all. It weaves its web before it is ever confronted with an actual fly. The web, therefore, cannot represent the physical image of a fly, but rather it is a representation of the archetype of a fly [*eine Ausschnitt des Urbildes der Fliege*, a clipping of the ideal image of a fly],¹⁰ which does not exist in the physical world. Hark! I hear the mechanists calling: they will say that by this example Umwelt-theory is revealed to be metaphysics; because he who seeks effective factors beyond the physical world is a metaphysician. (Uexküll 1982: 42; 1940: 20)

Instead of using schema to illustrate the *Umwelt* of the spider, Uexküll shifts to other terms, like the *Urbild*, *Urform*, *Urfasson*, and *Urpartitur* to indicate the ideal form (*eidos*) as a higher power over schema. This higher power prescribes an animal's developmental stages from its embryo to its death; the beginning has foretold the end. The program enacted in the cycle of the ideal form goes beyond human acquisition, but embodies Nature as an eternal composer, which is not constrained by time, space, and sensations:

There is no human knowledge that can be obtained through experience. The tunnel-boring actions of pea-beetle larvae prove to us that they are condi-

⁹ See Han-liang Chang's paper in this volume.

¹⁰ The 1982 translation literally translates *Ausschnitt* as representation, *Urbild* as archetype. The translator may not have paid much attention to the controversy that Uexküll evokes in this paragraph. From the position of an austere metaphysician, Uexküll makes a complete distinction from the Darwinian theory of defining the species as modifications (or representations) of the archetypes. Uexküll reminds his readers that the object of contemplation here is far from the physical types.

tioned by a transsensual knowledge that is timeless [*durch ein übersinnliches nicht an die Zeit gebundenes Wissen*]. Thanks to this knowledge, the composer can shape the future life-requirements of an unborn beetle [*noch nicht vorhandenen Käfer*] and program the actions of the beetle larva. (Uexküll 1982: 59; 1940: 40)

Despite the fact that Uexküll has rooted schemata in both human beings and animals, from an anatomical point of view, his idea of timeless transsensual knowledge in Nature debases human beings and the perceptions mediated by schemata. A beetle larva is far more superior to a human being in the way that it is always faithful to the higher command, but the human being does not have any capacity to realize the way it works (Fig. 1; Fig. 2). The gap between human beings and nature, which is bridged by Kant, becomes a gulf again when Uexküll allies with the animals:

Once this cardinal principle of nature's technique is understood, we can state that no progression occurs from the less to the more perfect. Because if a variety of theme of meaning extraneous to the animal influence its development [*Denn wenn fremde Bedeutungsmotive allseitig eingreifend den Aufbau der Tiere gestalten*], it is impossible to see how successive generations could alter this situation. [...] The triumphs of nature's techniques are readily apparent, but the manner in which its melodies are created cannot be investigated. Nature's techniques share common features with the creation of a work of art. We can, of course, see the painter's hand apply one color after the other to the canvas until he has completed the painting, but the creative melody [*Gestaltungsmelodie*] that moves his hand is wholly hidden [*unerkennbar*] from us. (Uexküll 1982: 75; 1940: 58)¹¹

¹¹ We can also find the metaphor of a painter at work in the first chapter of Michel Foucault's *Les mots et les choses* (1966). I hold the hypothesis that Foucault was inspired by Uexküll's idea either through his master, Georges Canguilhem, who formally gave three lectures about Uexküll at Collège Philosophique during 1946 and 1947, or during his one-year stay in Hamburg in 1959. As a daring explorer of knowledge, Foucault has the habit to prove what he hears or studies when he travels to the place that incubates the knowledge.

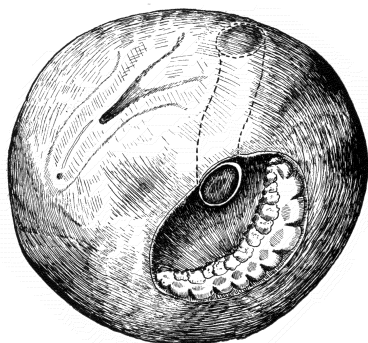


Figure 1. The magical tunnel made by pea-beetle larvae (Uexküll 1934: 87).



Figure 2. The personified Umwelt of ladybirds by an Estonian artist, exhibited in Tartu University Library during January 2004.

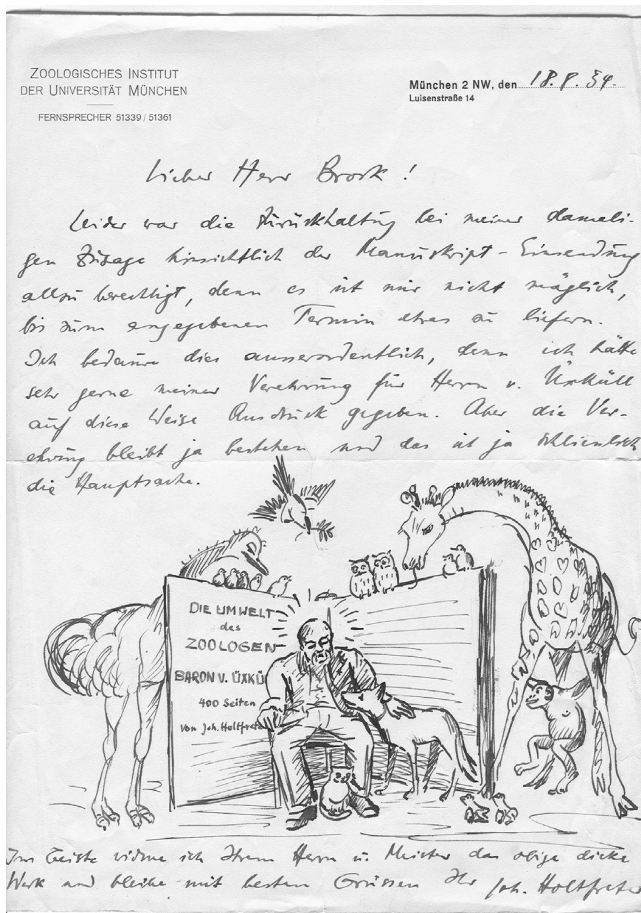


Figure 3. A cartoon drawing made by Johannes Holtfreter in München, included in a letter from him to Friedrich Brock, dated Aug. 18, 1934. Holtfreter was invited to contribute a paper for Uexküll's 70th birthday Festschrift. He did not send the paper but the letter and the drawing instead. The bulky book that he drew is dedicated to both Brock and Uexküll but the aura around Uexküll's head looks ironic. (Permission of Jakob von Uexküll Centre, Tartu.)

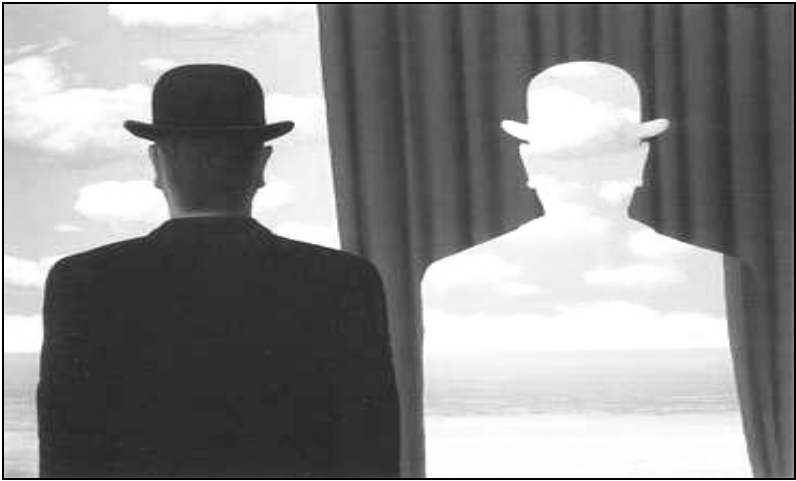


Figure 4. *Décalcomanie* (1966, René Magritte, 1898–1967).

Uexküll's endorsement of the animals within the invisible *Gestaltungsmelodie* conveys a religious overtone that regards the shapes of animals as a sign of the divine Nature. The presentation of the ideal form in *Gestalten* is a well-defined and meaningful theme shared by both an animal subject and its species, which is incongruous with the human rule of representation [*Vorstellung*]. The *Gestaltungsmelodie* repeats itself in a cycle that guides an animal subject in its former, present, and future existences; on the contrary, the rule of representation develops over time and creates differences for the human subject within his limited present life.¹² In his variation on the

¹² Some readers may wonder if Uexküll is influenced by Gestalt psychology, the trace of which can also be found in his *Theoretische Biologie* (1920), where he discusses the importance of apperception and the displacement (rather than the disappearance) of organic functions. However, Uexküll himself denies this link: "The results of studies of the building of forms (*Gestaltbildung*) are interesting but of limited theoretical interest for the knowledge of the problems of life. And this will not change even when we go deeper into the process of form-building (*Gestaltbildung*). But we have in every case, where an animal builds articles for its own use, a possibility of observing the process of form-building first hand. We can follow the weaving of a spider's web as accurately as we can follow the manufacture of an article for use by human [beings], say the shaping and firing of a coffee cup. In both cases the building of the form is bound to strict rules,

Platonic dialogue about Meno, Uexküll construes the ideal form as “a memory of former existence,” which is universal in animals but lacking in human beings. Uexküll has Meno and Socrates say:

Meno: Men always observe the models of their present lives only. They do not possess *an unforgotten knowledge* stemming from a previous existence, which could serve them as a rule for the actions of their present existence.

Socrates: You would find the disadvantage to be even greater if you made clear to yourself that man’s imitations of the objects he has seen during his present life never are the equals of their originals, whereas the objects which animals are capable of producing by drawing from their inner knowledge always are *the equals of their originals, sometimes even surpassing them*. (Uexküll 2004; 1943: 140; italics mine — J. C.)

It is exactly with the memory that is persistent in animals but lost in human beings that Uexküll fictionalizes the unknown. Uexküll levels himself to the same plane as the animals, and the spiritual meaning is thus comprehensive only between the animal subject and its objects, the privileged observer and his target animals, but excluded from other human beings. In establishing his extreme cult, Uexküll cleans away sensuality, digressions, and irregularity of shape from the holy Umwelts by embracing the Platonic and the Reformation paradox of immobile becoming, which is achieved in the unity of time (memory) but does not change over time (Fig. 3).¹³

[which] we can compare to tunes” (2001a: 121). The founder of gestalt theory, Christian von Ehrenfels, acknowledges the attainment of a pure and higher gestalt quality when one excludes the variations of time, space, and sensations *a posteriori*. This does not fully match Uexküll’s *Gestalt a priori*, either. The only concept of gestalt that matches Uexküll’s can be traced back to the Reformation text in the 17th century, in which the *Gestalten* are construed as the holy signs of Christ, materialized in the bread and the wine. Ernst Cassirer indicates that Kant in the 18th century purposefully dropped the Germanic *Gestalt* but picked up the Greek *Skema* when he illustrated the *Critique of Pure Reason* (Cassirer 1945: 118–120). Uexküll may have regressed to the religious connotation of *Gestalt* that was avoided by Kant. This is another example that reveals Uexküll’s resistance to his contemporary theories or concepts.

¹³ Uexküll in his autobiography describes his mother’s explication about the differences between the Catholic and the Protestant churches: “Die Bedeutung der evangelische Kirche liegt in ganz anderer Richtung. Sie dient als Versammlungsort für die christliche Gemeinde. In ihr ist jedes Glied vor Gott gleich. Das Wesentliche, was wir hieraus lernen sollen, ist, daß, so verschieden wir im weltlichen Leben nicht bloß an Rang, sondern auch an Charakter sein mögen, wir im geistlichen Leben alle schuldbeladene Geschöpfe sind. Alles Menschliche ist

Does Uexküll become incurably insane in his late years when he justifies the Platonic ideal form and memory for animals, but debases human beings' lack of them? In the second part of the dialogue, even his son, Thure, reminds his father that his belief is simply an illusion. However, Uexküll was very much aware of using the given, immobile and complete form (or memory) as a demarcation from his contemporary mechanist, vitalist and evolutionist views of life. Above the dominating factors of energy and matter, Uexküll acknowledges that he chose the third factor to imagine the immaterial relationships of the material structures:

When the whole complex of natural phenomenon was traced to only two factors, energy and matter [...] the third factor, form, was simply overlooked. [...]

Structure is not a material thing: it is the unity of immaterial relationships among the parts of an animal body. Just as plane geometry is the science not of the material triangles drawn on a blackboard with chalk but of the immaterial relationships between the three angles and three sides of a closed figure [...] so biology treats the immaterial relationships of material parts united in a body so as to reconstitute the structure in imagination. (Uexküll 1930: 19 and 9; quoted in Cassirer 1950: 200)

Uexküll's concept of geometry as an innate and immaterial relationship within an organism is given a purpose in the 1930s, both in *Die Lebenslehre* and *Streifzüge* (1934), before he dramatizes this principle again in the dialogue between a Greek master and a slave boy in 1943.¹⁴ Parallel to his identification of schema as the nervous system, Uexküll also takes the given but invisible relationship as his guiding principle in observing the autonomous actions of animals. In addition to the disagreement between the father and the son, the ideal form is also the main divergence between Uexküll and Darwin, though they both value the "hidden bond" in the species. For Uexküll, the hidden bond is persistent; it can be proved and not proved, both anatomized in the sense organs and imagined in the transcendental *a priori*. For

verschieden — alles Göttliche ist gleich" (1957b: 25). This may explain Uexküll's belief that animals are better creations than human beings: men are laden with sins, differences, or rather inequalities.

¹⁴ When Cassirer stayed in Sweden during 1940, he recognized the importance of geometry in Uexküll's theory and justified his work as one of those that follow the tradition of ideal morphology established by Cuvier and Goethe (1950: 199–203).

Darwin, it takes time to find it out, and will be revealed in the unpleasant and rudimentary organs in an animal (1964: 450-58). The ideal form for Darwin is simply a creation myth, which may occasionally survive as the archetype in the species that leave a small number of eggs. For most species with a big population over a long historical period, in which the new forms constantly supplant the old ones, the archetype or the prototype has already been terminated. Even if it survives in an irregular shape, it is not functional any longer. What kind of truth about nature is revealed in their diverse explanations over the structures and actions of animals?

4. Michel Foucault versus Ernst Cassirer, two perspectives of history

In evaluating the gaps between Uexküll and Darwin, Cassirer subsumes them both under the Kantian definition of teleology, which only makes differences in the maxims that the reflecting subjects propagate but are not constituent as a real end in nature (Cassirer 1950).¹⁵ The following Kantian paragraphs echo Cassirer's interpretation:

Strictly speaking, one must call this legislation *heautonomy*, since the power of judgment does not give the law to nature nor to freedom, but *solely to itself*, and it is not a faculty for producing concepts of objects, but only for comparing present cases to others that have been given to it and thereby indicating the subjective conditions of the possibility of this combination a priori. [...] The concept of a real end of nature therefore lies entirely outside the field of the power of judgment if that is considered by itself. [...] Hence whatever may be found in experience to belong to teleology contains merely the relation of its objects to the power of judgment and indeed to *a principle of it by means of which it is legislative for itself (not for nature)*, namely as *a reflecting power of judgment*. (Kant 2000: 28, 34, 35; italics mine — J. C.)

¹⁵ Thanks to Prof. Frederik Stjernfelt in Copenhagen University, I came to read the 4th volume of Cassirer's *Erkenntnisproblem*. After listening to my presentation in the 3rd Gathering in Biosemiotics in July 2003, he suggested that I find a mediation between Uexküll and Gombrich from Cassirer. Nevertheless, I find Foucault more beneficial than Cassirer in rationalizing the paradox in Uexküll. Cassirer's bias of ethology and zoology overshadows his willingness to explore the mutation in Uexküll's theory.

By returning to the Kantian notion of an enquiring and regulating subject, which cares more about integrating different thoughts than arguing over absolute truth in nature, Cassirer allies with the rational and contingent proponents of truth to point out the shared dogmatisms among the late 19th century scientists. However, if we treat each scientist as a consistent and congenial agent in propagating his own theory, the history of ideas would be strangely continuous and quiet. Foucault reminds us of the fallacy in Cassirer's historical perspective:

Cassirer exerts himself to find out *the intrinsic necessities* of the thought discourses; he lets the thought think all by itself but not to continue the veins of them better and to show the branches, the divisions, the intersections, and the contradictions which outline the visible figures in them. He isolates all the other histories (of the individuals, as much as of the societies) as *autonomous rather than theoretical space*: [and] under his eyes, he discovers *a history, which simply stayed quiet at the time*. (Foucault 1966: 3; italics mine — J. C.)¹⁶

We have gathered that Uexküll actually creates some noises in his theory by bringing Plato, Kant, and his religious belief into an arena of confrontations; he resurrects the Platonic ideal form at the expense of his solid study of Kantian schematism; he acknowledges and denies sensations interchangeably; he is both a theoretical biologist and an austere metaphysician, preaching absolute harmony in nature and in arts. His beloved paintings, music, and architecture even become condescending products when he follows Plato's reasoning. Nevertheless, the noises that we find in his paradoxical portraiture of form (*Schema, Urform, Gestalt*) differentiate the subjective Umwelts into two kinds: the one which follows the rule of resemblance but

¹⁶ In his critique on Cassirer's book, which had been newly translated into French, Foucault says: "Cassirer s'efforce d'en [discours-pensee] retrouver les nécessités intrinsèques; il laisse la pensée penser toute seule, mais pour mieux en suivre les nervures et faire apparaître les embranchements, les divisions, les croisements, les contradictions qui en dessinent les figures visibles. Il isole de toutes les autres histoires (celle des individus, comme celle des sociétés) l'espace autonome du <theorique>: et sous ses yeux se découvre une histoire jusque là restée muette. Ce découpage paradoxal, cette abstraction qui rompt les parentés les plus familières n'est pas sans rappeler les gestes iconoclastes, par lesquels se sont toujours fondées les grandes disciplines: l'économie politique, lorsqu'elle a isolé la production de tout le domaine concret des richesses, la linguistique, lorsqu'elle a isolé le système de la langue des tous les actes concrets de la parole."

pathetically produces variations, degradations, and illusions; the other obeys the rule of similitude and cleverly follows the same original circuit. Schema as a mediation between the inner world and the outer world acquire its pleasant life within the rule of similitude, but will definitely become a dead end (*totdgeschlagen zu werden*), if it is designed to distinguish the outer world point by point, sound by sound, and color by color (as Uexküll criticizes atomism in his letter to Mach).

According to Foucault, the interplay between resemblance and similitude helps one recognize the epistemological breaks in history. There are two major breaks, the one between the 16th and 17th centuries and the other between the 19th and 20th centuries, in which the rule of similitude takes the upper hand over that of resemblance.

The rule of similitude transforms the history of science from natural philosophy to biology; the former is based on an observer's naked eyes and his classification of the different features among animals and plants, whereas the latter highlights the hidden bind inside the organisms. The transition from the appearances to the invisible relationship recoups the study of nature from the living beings (*les êtres vivants*) to life itself (*la vie*) (Foucault 1994: 160). From the Foucauldian perspective, both Darwin and Uexküll participate in this break with their enquiries over something inside an animal that determines its changes in appearance and action, but Uexküll practices the rule of similitude more straightly by drawing our attentions to the constant, restrictive, and repetitive cycle inside a cell, a neuron and an organ. The Uexküllian confident life only follows the rule of similitude, a clipping and a circulation of the ideal Gestalt (Fig. 4).

5. Structural linguistics and theoretical biology

Bracketing Uexküll's transcendental configuration of form and image, we still find that the schema, in its sensual and nervous context, serves as a crux of life. It brings a typical relationship to the materials of sensation (*Empfindungsmaterial*) and triggers an animal's reaction to the outer world. As we can tell from Uexküll's alienation from "reflection" to his affiliation with "the centralized pathways" in defining the schemata, the typical inner relationships generate their

own speech-acts (*énonciations*), but do not resemble the proper name (*énoncé*) of an object outside the animal subject. Uexküll distinguishes his functional circle from Pavlov's reflex in his letter to Heinrich Junker in 1937:

Pavlov called this a 'conditioned reflex'. The same effect can be obtained by saying the word 'meat'. Still, from this one cannot conclude that the dog understands the word meat. [...] The experiments carried out by Dr. Sarris at the *Institut für Umweltforschung* are a different matter. [...] The word 'chair' for the dog is not the name of a thing [*einen bestimmten Gegenstand*] but of a performance [*eine Leistung*]: to sit. To me this seems a fundamental feature of language as a means of communication between human beings as well. The spoken word, a certain sequence of sounds as carrier of sense and meaning, relates primarily to performances and not to things [*nicht auf einen bestimmten Gegenstand*]. (Uexküll 2001b: 446; 1980: 297–298)

Uexküll's insight about the speech-act reminds us that the arbitrariness of sign cannot be found between the inner world and the physical objects; it simply stays within the inner world, or rather in the schema, the nervous system and the subjective universe. This arbitrariness is located in the causal relationship between "to notice" (*merken*) and "to act" (*wirken*), the emergence of attention ideally refers to an action. The outer world is thus only an imprint of this arbitrary biological relationship in the nervous system. It is within the schema that we can find the convergence of sign and design in Uexküll. Uexküll's erasure of the proper names and his interest in the synchronic changing shapes situate his theory more in the paradigm of structural linguistics than in philology.¹⁷

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¹⁷ Saussure invests his energy to find out the law that governs the linguistic forms across time and space. Uexküll's experiments based on the philosophical, anatomical, and transcendental form reveal the law that governs the performances of animals across species.

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Схема как ключ и загадка жизни: размышления над проблемой Юкскюлла

Проблематика Якоба фон Юкскюлла проявляется в его парадоксальном описании формы как части плана природы — в качестве как схемы восприятия так и идеальной формы. На первый взгляд вера Юкскюлла в описания неподвижно проявляющейся формы (наподобие Платона и мыслителей времен Реформации) кажется уступкой в остром споре среди его современников: материалистов, виталистов, динамистов и эволюционистов. Тем не менее, в смысле кантовской субъективной телеологии принятие Юкскюллом античной философии воссоздает невидимый, статичный, но повторяющийся цикл как регуляционный принцип в активности животных. Этот регуляционный принцип отличается от правила подобия, например, между внешностью животных и их окаменевшими останками, которое линейно, неполно, дигрессивно. По Мишелю Фуко переход от видимого к невидимому сопутствует переходу от исследования живых существ к исследованию самой жизни, от философии природы к биологии. Теория знаков Юкскюлла зарождается из его наблюдений над проблемой выяснения того, что моделирует действия животного в его умельте. Оказывается, что схема в ее чувственном и функциональном контексте развивается из отражения объектов в совокупности их свойств. Удаление Юкскюллом имен собственных, которое направляет наше внимание на презентацию в ее чистом виде (*Gestalt*), представляет собой важный шаг не только в эпистемологии, но и в “науке жизни”, которая с ненужной тщательностью углубилась в генотипы.

Skeem kui elu võti ja mõistatus: peegeldusi Uexkülli probleemile

Jakob von Uexkülli probleemistik avaldub ta paradoksaalses vormikirjelduses looduse plaani osana — nii tajuskeemina kui tajuülese ideaalse vormina. Esmapilgul tundub Uexkülli usk Platoni (ja reformatsiooni-aegsetesse) mõistetes liikumatuna ilmuvast vormist resignatsioonina ta kaasaegsele teravale dispuudile materialistide, vitalistide, dünamistide ja evolutsionistide vahel. Siiski, Kanti subjektiivse teleoloogia mõttes, antiikfilosoofia vastuvõtt Uexkülli poolt taasloob nähtamatu, staatilise, kuid korduva tsükli nagu ka regulatsiooniprintsiibi loomade aktiivsuses. See regulatsiooniprintsiip eristub sarnasusreeglist, näiteks loomade välimuse ja fossiilsete jäänuste vahel, mis on lineaarne, mittetäielik, digressiivne. Michel Foucault mõttes, üleminek nähtavalt nähtamatule käib kaasas üleminekuga elusolendite (*les êtres vivants*) uurimiselt elu enese (*la vie*) uurimisele, loodusfilosoofialt bioloogiale. Uexkülli märgiteooria sünnib ta tähelepanekuist probleemi üle, mis modelleerib ja käivitab looma toimimist ta omailmas. Osutub, et skeem, oma meelelises ja funktsionaalses kontekstis, kujuneb objektide peegeldustest nende omaduste kogumisse, kus pärisnimesid ei tunta. Pärisnimede eemaldamine, nagu Uexküll seda teeb, juhib tähelepanu esitusele puhtal kujul (*Gestalt*) ning kujutab endast mitte üksnes tähtsat sammu epistemoloogias, vaid ka eluteaduses, mis mõttetu peensusega on kaevunud genotüüpidesse.

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