Non-Machines Meet Art

Ursula Damm

Until about 50 years ago, there was no place in contemporary Western art for living beings; they were subjects of representations, but not present as active agents in an artwork. Since humans and animals appeared with their performance in visual art, they caused a *commotion*, a *malfunction*, and a *scandal***.** When we now speak of non-machines, we simultaneously acknowledge and include the machine as a human artefact in the group of actors in works of art. For the creators of artistic artefacts — the humans themselves — non-machines seem to remain incalculable. Since a work of art must come up with formal descriptions of structural couplings of actors with their environment, the appearance of non-machines can even be seen as a measure of a technology's ability to consistently describe reality — and where our concepts of reality may fail.

Looking into the appearance of animals in artworks and my own practice, I will show how curators and exhibition makers experience non-machines as unpredictable elements in their habitat. Non-machines challenge contemporary art practices; but, further, how can the network between audiences and non-machines be improved?

Animals as Performers in Art and Architecture

Art as a deeply human form of expression stands for an exemplary worldview. During the modernist period, art practice became established as a creation of artifacts. Performative practices had been rather marginal — peripherals complementary to the works themselves. Importantly, when an artist includes an animal in a work, the artist has automatically taken on a moral responsibility: this article wants to show that ethical implications become visible and manageable as soon as non-humans can express their own voice in performative arrangements. The advocacy of a performative practice allows the other creature to express itself and avoids acts of othering in which humans speak for non-humans.

Whether human, animal, or machine, each exists in its own intrinsic rhythms of time. Digitalisation processes like runtimes and interactions — particularly when focused on the realm of the living and accompanying natural rhythms — have given time a new significance. In contemporary artworks, the processes of machines often intersect with the performances of various non-machinic actors through the processing of sensor data. The following examines how these rhythms interact with each other and what it means when these interactions become constituents of the work.

In the early times of human civilisation and in indigenous cultures, plants, animals, and humans as performers were not uncommon as carriers of meaning in the realm of art, but in the course of our "civilisation" they had been sorted out. They then appeared in condensed form, in representations, while they had no right of self-expression within the artwork.

When did it happen that the expressions of the non-machines — animals, humans, or plants — were again welcome as a constituent part of an artwork on equal standing with the skillfulness of humans themselves? Was it, as George Gessert suggests in his book *Green*

Light,[1] the *Delphinium* cultivations of Edward Steichen, which were exhibited at the Museum of Modern Art in 1936?[2] Or the coyote "Little John" who, at Joseph Beuys' instruction, stayed with him for days at the Rene Bloch Gallery in New York and performed together with him?

Delphiniums achieved their beauty through Edward Steichen's skillful years-long breeding: conscientious genetic selection of aesthetic characteristics. He presented them on June 24th 1936 as an aesthetic practice at the MOMA. Animals found their way into Joseph Beuys' oeuvre when he explained pictures to a dead hare (1965), implying that the delicate creature (the hare) has lost its life in the universe of paintings. Beuys thus implicitly makes it clear that the world of art is not animal-friendly — not to mention that humans do not always appear to be world-friendly either. A gallery or a museum is a building for dead artefacts where living creatures lack the fundamentals for their survival: food, moisture, sunlight. Beuys' statement that humans are not world-friendly finds a clarification here that criticises the concept of art as a discipline of lifeless artefacts.

In 1974, Beuys staged another encounter with non-human performance: an experiment in which the incalculable actions of the coyote became the main vehicle of the statement. Beuys exposed himself to the wildness of the coyote, which he had brought into a gallery space, thereby also taking a risk for his own physical integrity. Beuys only wanted to visit America, shielded in an ambulance, in order to meet an indigenous animal; he did not want to confront American society, at that time. By juxtaposing American culture with the culture of its indigenous inhabitants, for whom the coyote is an important animal, Beuys wanted to unmask the habits of civilisation.[3]

The importance of this performance lies in the fact that Beuys does not describe or depict animals from an external position,[4] but engages in a performative encounter with the coyote, the outcome of which is uncertain and grants both actors the same rights. Structural framework conditions become visible, but also possibilities of connecting and experiencing. Nevertheless, Beuys was certainly more at home in the gallery space than the coyote, whose behaviour can be seen as a kind of assessment of the art exhibition from an animal perspective. In this respect, this coupling between humans and animals cannot be regarded as symmetrical.

Throughout the 70s, animals and plants increasingly found a place in art as active and performing beings. One could recall the horses by Kounellis,[5] the mosquito by Dennis Oppenheim,[6] installations by Hermann de Fries or Luis Weinberger, or “Wilma the Pig” by

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[1] George Gessert, *Green Light: Toward an Art of Evolution*, (MIT Press, 2010).

[2] *“The Museum of Modern Art, 11 West 53 Street, announces a very unusual one-man, one-week show which will be opened to the public Wednesday, June 24, at one p.m. It will be an exhibition of "Steichen Delphiniums"—rare now American varieties developed through twenty-six years of cross-breeding and selection by Edward Steichen.*”; “The Museum of Modern Art”, accessed February 26, 2024, https://www.moma.org/momaorg/shared/pdfs/docs/press_archives/331/releases/MOMA_1936_0027_1936-06-18_18636-17.pdf?2010.

[3] "I Like America and America Likes Me," *Wikipedia, The Free Encyclopedia*, accessed February 27, 2024, https://en.wikipedia.org/w/index.php?title=I_Like_America_and_America_Likes_Me&oldid=1186965739.

[4] A cyberneticist would call it a second-order observer.

[5] Jannis Kounellis, “Twelve Live Horses (Untitled) at Galleria L’Attico in Rome”, 1969, accessed February 26, 2024, https://www.phaidon.com/agenda/art/articles/2021/march/23/how-jannis-kounellis-and-12-horses-made-an-arte-povera-masterpiece/.

[6] Dennis Oppenheim, “Material Interchange for Joe Stranard, Aspen, Colorado”, 1970, accessed February 26,

the Harrisons.[7] All these works see animals and plants as integral to artistic self-understanding and cultural historiography.

Why did that happen? The more technical art has become, the louder the call for primordial, endemic practices and a return to the rituals of indigenous cultures who live close to nature and whose relationship with it is less alienated. This desire may stem from the fact that the cultural implications of technology on our daily life can be identified more easily before the background of indigenous practices. But the time aspect also became more important: a machine does not work as a figure of representation, but through input, processing and output. In the simultaneity of machine runtime and the lifetime of non-machines, many entanglements arise between the respective time rhythms, which offer couplings and intertwine with the history of the other. And as we want to see the machine having become something more than a system of input and output with an aim of control,[8] we need to look at the environments in which machines and non-machines are living.

Connections Between Machine and Natural Agents in Artworks of the Early Computer Age

When bioart emerged — while its beginnings lie in the late 1980s, its heyday was around 2010 as a result of the decoding of the human genome — people did not look at the wholeness of living beings and how they behave, for example, as a result of their genetic determination, but focused instead on their genes. Genes that now seemed to be just as reductionistically operable by humans as a digital machine. The organism as a whole, the self-expression of the subjects, and their behaviour was lost from view; the emphasis of public attention was the genetic code in its potential for experimentation.[9]

Especially in speculative design, the genetic code as an editable form of life led to numerous visions, which in turn could become the driving force of a new civilisation.[10] Much has been written about the empowerment of humans as creators of new forms of life — even if our civilisation is currently causing the extinction of species on a gigantic scale. Isn't it better to invent new beings, with new characteristics, rather than to build computers — especially at a moment when machines are already able to think and decide with their own intelligence, beyond the reach of their creators? Animals and plants resist being reduced as subjects to the operability of the machine even when AI seems to catch up with their minds through autonomous decision-making. In this situation, media art is increasingly finding its purpose in evaluating technological fantasies and their societal implementation in terms of their cultural consequences. As a kind of assessment, the discourse on non-machines should now show *to what extent machines are capable of understanding biological subjects*, and to what extent the concept of humans and other non-machines can be grasped by machines. The discourse on non-machines proposes a thought exercise, namely that we humans imagine ourselves to be machines that must imagine how to perceive and interact with animate

2024, https://www.metmuseum.org/art/collection/search/285232.

[7] Nada Miljković, “The Harrison Studio presents Wilma the Pig”, accessed February 26, 2024, https://youtu.be/BgsFnRzGrJY?si=lZF4UgqIbU_9bW3x.

[8] As mentioned in the article by Mindaugas Gapsevicius.

[9] Ars electronica had reinforced this view of bioart over the years with the Hybrid Arts section of the Cyberarts competition and curator Jens Hauser as jury chairman.

[10] Anthony Dunne and Fiona Raby, *Speculative Everything Design, Fiction, and Social Dreaming* (MIT Press 2013).

beings.

How Can a Machine be Configured to Act as a Mediator between Non-Machines and Machines (referring to Gregory Bateson)?

Having studied at the Düsseldorf Academy, I often asked myself, how Beuys would have reacted to the dawning computer age? He died in 1986, before the computer started to become a tool of everyday culture.[11] Five years before Beuys' performance in New York, the Architecture Machine Group, under Nicholas Negroponte at MIT in Boston, developed URBAN5. SEEK, the installation for URBAN5, consisted of a robot, aluminum cubes as modular architectural representatives, and gerbils that were supposed to live in the arrangement. The cube-shaped, zinc-plated objects are aesthetically, unmistakably, inspired by the reductionism of modernist architecture: gerbils thus live in a model city in which URBAN5 can design spaces and surroundings in response to their behaviour.

> The installation, entitled SEEK, was part of [...] the exhibition "Software" at the Jewish Museum in New York in 1970 curated by Jack Burnham. The Architecture Machine Group's goal, which later became the MIT Media Lab, was an attempt to evaluate architectural design by enclosing gerbils in a physical Plexiglas container with a model of five hundred zinc-plated cubes (representing building blocks of architecture) which were moved with a robotic arm.[12]

Interestingly, in his publication Nicholas Negroponte finds it unnecessary to talk about how the animals — the gerbils — were doing in their architectural model.[13] A reviewer of the exhibition indeed used the conduct and fate of gerbils as a criterion for judging the artwork: their aggressive, destructive reaction paints a fatal picture of modernist-inspired aluminium architecture.[14] Edward Shanken was even more critical; in his 1998 article, he describes the disastrous outcomes of one of the first exhibitions of interactive works:

> I would be remiss if I did not mention that in many respects "Software" was a disaster. The DEC PDP-8 Time Share Computer that controlled many of the works did not function for the first month of the exhibition due to problems with, ironically enough, the software. The gerbils in SEEK attacked each other, a film was destroyed by its editors, and several aspects of the exhibition - including the catalog - were censored by the Board of Trustees of the museum. The show went greatly over budget which put the Jewish Museum in a precarious position financially. The Jewish Theological Seminary bailed it out, but dictated a radical shift in the museum's mission, which precipitated Karl Katz's dismissal as its director and its demise as a leading exhibition space for experimental art. The show was scheduled to travel to the Smithsonian Institution, but that venue was canceled. Many other controversies plagued Burnham's ill-fated exhibition.[15]

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[11] Joseph Beuys, *Provokation. Lebensstoff der Gesellschaft* (Kunst und Antikunst, 2003).

[12] Nicholas Negroponte, "SEEK", 1970, Closed Worlds, accessed 27 February, 2024, https://www.closed-worlds.com/seek.

[13] Nicholas Negroponte, *The Architecture Machine: Toward a More Human Environment* (MIT Press, 1970). https://doi.org/10.7551/mitpress/8269.001.0001.

[14] The reviewer noted: "When Negroponte's Architecture Machine broke down at the Jewish Museum in 1970, the gerbils looked shipwrecked, cowering before the broken arm of the computer, covered—not incidentally—with their own excrement"; and further cautions, "artists who become seriously engaged in technological processes might remember what happened to four charming gerbils". Thomas Hess, "Gerbils ex Machina," *Art News*, December, 1970, p. 23.

[15] Edward A. Shanken, "The House That Jack Built: Jack Burnham's Concept of 'Software' as a Metaphor for Art," in *Intentionality and Semiotics in Art* (2011), https://api.semanticscholar.org/CorpusID:56437894.

From today's perspective, the *Software* exhibition is undoubtedly a historical milestone, an important impulse to include the media of the time in a cultural discussion. While computer technology has become more reliable, the question of whether non-machines feel comfortable in a machinised environment has not really been answered. SEEK undoubtedly marks an important step in the history of architecture and can be seen as an installation that not only aesthetically anticipated architecture in a model, but also evaluated it as a habitat. But to this day, there has been no revision of the experiment.[16] Nicolas Negroponte himself described SEEK as “a sloppy problem solver" and published a book on the installation with a listing of the system’s shortcomings.[17] Yet Negroponte has no word for the surrogate humans of his model architectures, the gerbils — their voice remains unheard.

The art historian Jack Burnham was understanding electronic media as aggressive and — linked to the military systems — implicating the potential of biological self-destruction. Nevertheless, in 1968 he saw the role of the artist as a decision-maker in dealing with the aesthetics of the entanglement of systems with one other. But after the disastrous ending of his exhibition, Jack Burnham subsequently kept his distance from technologically inspired art and accused media artists “of aligning themselves with a capitalist industry”.[18] While, in 1968 he was still highlighting that “the significant artist strives to reduce the technical and psychical distance between his artistic output and the productive means of society”, he was not initiating any attempt to analyse SEEK as a system of architecture, linked to the habitat of gerbils, which had to be evaluated as an experiment with an open outcome.[19]

The Habits of Culture Versus the Rules of the Habitat

The first art history lecture I attended, in 1979, was on Le Corbusier and the fate of the *Unité d'habitation* in Briey, France. It dealt with the building’s social decline and gradual abandonment, which found expression in the depressed psychological condition of its residents alongside criminality. At the time of the lecture, the demolition of the building was still under discussion. Today it is an architectural monument. Le Corbusier’s plans were far removed from the speculations of SEEK, but can we say that the interactivity of the architecture machine was designed to overcome the deficits of modernist architecture?

I would, unlike Jack Burnham, not speak of “a panacea that failed”.[20] The mechanisation of everyday life has reached a level where digital and technical methods and artifacts appear to be a normal part of human expression. An art that evades these methods would be anachronistic. What our generation of media artists has learned is not only to outlast and overcome the error-proneness of machines, but also to use every step of our practice to learn more from our environments and the way machines face those *umwelts* and their

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[16] Lutz Dammbeck reenacted the experiment for a film and an exhibition in Hamburg; Lutz Dammbeck, “Seek II”, Herakles Konzept, accessed 27 February, 2024, https://www.herakleskonzept.de/material/index.php/video_seek-ii_making-of.html.

[17] Negroponte, *The Architecture Machine: Toward a More Human Environment*.

[18] Jack Burnham, "Art and Technology: The Panacea That Failed", in *The Myths of Information: Technology and Postindustrial Culture*, eds. Kathleen Woodward, Madison (Coda Press, 1980); repr. in *Video Culture: A Critical Investigation*, ed. John Hanhardt (Visual Studies Workshop Press, 1986).

[19] Jack Burnham, “Systems Esthetics”, reprinted from Artforum, September, 1968, https://www.mat.ucsb.edu/~g.legrady/academic/courses/07f130/system_burnham.pdf.

[20] Burnham, "Art and Technology: The Panacea That Failed".

actors.

Looking into my own practice I can report that the attempt to integrate non-machinic actors into a public work of art very quickly reaches the limits of tolerance among both clients and those responsible. In New York in 1992, I showed an installation, *Migration-Vogelflug*, with pigeons that lived in the exhibition space: the presence of birds was intended as a provocation to address the visitor's desire for an open space and freedom of movement. Meanwhile, videos were showing commuters in Grand Central Station rushing from train to work and from work to train in the morning and evening: integral to this process, the commuters' sense of purpose disappeared while the haste and longing remained visible.

The videos shown there were accompanied by texts from the Roman augurs and spoke of the "migratory restlessness" of birds in auspices. Through the juxtaposition of Roman prophecy with the imprisonment accompanying the daily rush hour, it can be asked how we gain a view of more primal — in this case animal — role models to question the imprisonment of our self-made civilisation. The provocation worked: in the exhibition's guest book, a wild discussion arose about the poor birds, which were locked up in a 120 square meter room; the identification worked wonderfully, even though hardly any visitors recognised themselves in the commuters.

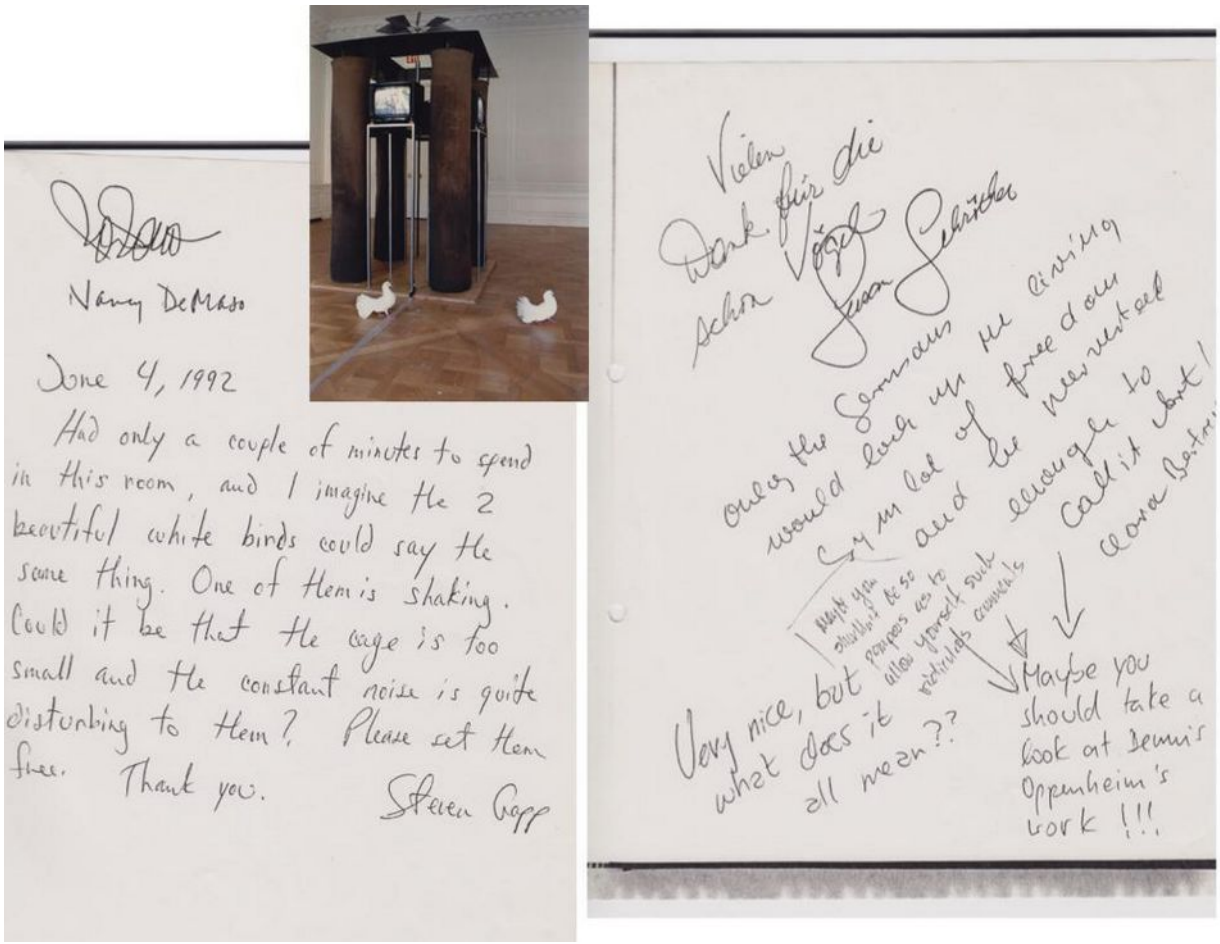

Fig. 1: Exhibition guest book

But, one visitor then mentioned Dennis Oppenheim's Mosquito, from the 1970 work

Material Interchange, in the midst of the lively discussion as to whether the birds were allowed to be in this exhibition space or whether this was barbarism.

Fig. 2: *Material Interchange for Joe Stranard*, Dennis Oppenheim, 1970. The mosquito is filling its body with material lying below the surface on which it stands. It then becomes airborne, thus creating a material displacement. The blood now conforms to the interior configuration of an insect, thereby placing part of you in a state of aerial displacement. © Dennis Oppenheim Estate

If you take the perspective of the machine, then that would be the perspective of the institutionalised transport companies that look at their commuters: they see nothing but their desire to get from A to B, without asking themselves how this happens and whether it is due to necessity or desire. *Migration-Vogelflug* reminds us that birds fly over incredibly wide landscapes during their lives and would not be satisfied with the narrow perspectives of our metropolises.

Then in 1999, I once again sought closeness to animals, this time pigeons, and planned an architecture for them on the occasion of a public art competition in Cottbus, Brandenburg. The artwork was planned to be built, in cooperation with local pigeon breeders, next to the library building from Herzog de Meuron which was announced as “a biomorphic shape which allows a flexible, open plan layout on every level”. However, biology was only serving as a metaphor for architecture: Herzog de Meuron feared that the pigeons in the planned pigeon loft would decorate the glass shell of their building with excrement. So, it was hoped that the planned dovecote would be as far away from the building as possible.[21] This demonstrates that to date, architecture has been happy to take nature as a representative model, but

[21] However, the economic situation of the Technical University Brandenburg in Cottbus in the years following the fall of the Berlin Wall, with no budget for the operating costs, made the installation unfeasible.

avoids including its metabolic processes into its function. As it concerns Herzog de Meuron, architecture is dedicated exclusively to the metabolism and habits of humans. The architecture machine was not developed any further. I know of no approaches in which habitation is explored as a practice to be evaluated interactively with the construction of houses and neighborhoods. While there are many examples of interactive cities where data is used to generate the designs,
the active involvement of non-machines — test subjects or “habitants” — is extremely rare. This is due to the complex settings and the long periods of time that this form of construction and creation would require.

The Shared Habitat as a Map and a Territory

In recent months and years, we have increasingly been confronted with territorial conflicts. Our book *Shared Habitats* addressed the issue of actors of different kinds/species living together in a shared territory.[22] After we had collected the contributions for the book, it became clear to me that the most difficult chapters of *Shared Habitats* had not yet been written: namely the one about the conflicting stakes in the territories and the resulting demarcations. Borders are not something that generate enthusiasm or help a book to attract attention. On the contrary: borders are a consequence of the conflicts that no longer seem solvable, the collapse of common ground and the establishment of lines of decision-making. But borders are not to be seen only as a negative thing: beyond these lines, communities can come together in new formations and find their own structures.

Nevertheless, the process of finding boundaries is fraught with conflict. And this is just as true for the borders of countries as it is for the borders between humans and non-human creatures. If we look at the course of the evolution of living beings, we can learn to understand the couplings between non-machines and their respective environments as emergent behavior and the consequence of an entanglement. Darwin received valuable inspiration for his theory of evolution by visiting the Galapagos Islands. Their remoteness and the natural boundary, the sea, made it possible for living creatures to change over time and for new species to emerge. Undisturbed ecological niches fostered a protected form of evolution, while the same species became extinct in other areas of the world due to evolutionary pressures.

Similar interactions of field and species could be observed while working on artificial life simulations. My own experiments date from 2004, and the development of *Double Helix Swing*.[23] My Creatures — small software agents that reproduce according to the rules of evolution — could only develop rather monotonous abilities in a free, unlimited field with high competition and a good food supply, due to the strong selection pressure. It is a simple type of "creature" that is the fittest — evolutionary most successful — there. More complex abilities and structural differentiations can be found in niches, in the absence of enemies and under less evolutionary pressure and, above all, *behind border formations*. On the Galapagos Islands, the consequence of the boundary is aesthetic: the beauty of nature and its highly differentiated varieties.

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[22] Ursula Damm and Mindaugas Gapsevicius, *Shared Habitats:A Cultural Inquiry into Living Spaces and Their Inhabitants* (Transcript Verlag, 2021).
[23] Ursula Damm, “Double Helix Swing”, 2006, accessed 27 February, 2024, https://ursuladamm.de/double-helix-swing-2006/.

The role of machines is a special one here: during the design of the algorithm, it is a spawn of human will, but in its actions, it leaves the intention of its creator behind; it orients itself to the conditions of a territory, the virtual environment in which Creatures live. The perspective of the machine reveals to the acting human being what the field is like and how he can prove himself in this field. The software agents move in a mathematically fixed space of possibilities, which is structured by the specification of an optimisation goal and yet is a territory of coincidences, diverse conditions, paths and detours, potentials and traps.

The book *Shared Habitats* describes the territory in which we live as a space that is shaped by the milieus of countless actors. Only by taking their complexity into account is it possible today to create a culture that is peaceful in nature. The book focuses on artistic activity rather than the social challenges that the shared habitat holds in reserve for us as a common challenge. In the book, with reference to Jakob von Uexküll, I described how living beings orient themselves in their *Umwelt* — the perception bubble of their senses. Based on their physical abilities to process impressions, living beings develop a repertoire of behavioural patterns with which the outside world is perceived, and interacted with, to gain an individual or species-specific meaning. The mindset of a creature and its conception of reality therefore is based on a repertoire of patterns; however, if a creature moves outside familiar surroundings and comes into contact with new environments, it uses these patterns with a growing risk of misinterpretation and misunderstandings. Yet, the patterns are still determining how our brain perceives novelty.

My emphasis on patterns for the design of sensor interfaces goes back to patterns in the understanding of Gregory Bateson.[24] First, he explains that the brain creates different connections based on perceptions rather than the causal correlations of things in reality. For this, he quotes Alfred Korzybski's aphorism "the map is not the territory" and, further, questions: "Do you ask what it's made of — earth, fire, water, etc.?" Or do you ask, "What is its pattern?"[25] Alfred Korbzyski, reminds us that a map created — by our brain — is not the territory that it references. Our way of describing the "territory" should not be confused with its properties in reality: they reference only one or some of many aspects of reality. In a time where we ask ourselves what the implications of AI might be on our future, we will be redirected to this phrase quite often. The conceptual maps of our reality, created by AI systems, are given the power to make decisions on our behalf. Therefore, today the shape of our digital, high-dimensional maps of knowledge are a key element in the building of new editions of the real.

In his article "Machine as a Companion", Mindaugas Gapševičius outlined that:

> The machine becomes a mediator between the two [subjects], becoming able to provide senses of the Other as this Other is sensing the umwelt. And even if the machine malfunctions, I would still be able to ask: How does a dog understand its umwelt? How does

[24] Gregory Bateson, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (University of Chicago Press, 2000).

[25] "A map is not the territory" is introduced by the Polish-American mathematician Alfred Korzybski in an essay on the meaning of representation which he published in 1931; Alfred Korzybski, *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics* (International Non-Aristotelian Library Publishing Company, 1933).

a plant see me? How is it to be a bacterium?[26]

With his artworks, he actively works on the setup of the sensors to connect subjects in order to learn from each other. He advocates viewing the machine not as a subject that is given decision-making power in the same way as a non-machinic agent (control), but rather using the machine as a network of sensors and topologies of connections which trigger decisions of the linked subjects.

I would like to agree with Mindaugas Gapševičius here, moving from the machine as a tool of control to a machine as a companion. SEEK, the installation of the architecture machine was not a companion, it was not capable of responding to the actions of the gerbils in a meaningful manner. Today the term machine should include the IOT or Ubiquitous Computing: concepts addressing the performative actions of the world beyond the central processing unit and including “tentacles” to the environment in their system. Both concepts build on an understanding of the machine which sees it as a net of sensing, computing, and performing units, tied together by the protocols of designers. But, still, we don’t know how a machine can become a companion.

This question brings me to Ross Ashby, a pioneer of cybernetics and systems theory. He introduced the concept of "requisite variety".[27] A system able to successfully manage or control the complexity (he uses the term variety) present in its environment, must possess a comparable or higher variety within itself. That makes it clear that with a single sensor, we only can have a very narrow view of our surroundings. If it is about another creature, another human being, or a complex machine, only the combination of several signals (inputs) allow us to imagine, reconstruct, and interact with a much broader setup of what we call a companion.

Patterns which Connect

Gregory Bateson uses the phrase “*pattern which connects*” to refer to the interconnectedness and underlying structures that exist within complex systems, whether in nature, society, or the mind. He sees the importance of patterns in the ecologies of networks. He understands these patterns as (historically) condensed forms of behavioral habits which are preserved in communities as a kind of tradition and customs, providing knowledge of how to do things together, to bring people together in repeatedly executed repetitive forms of action. These patterns can be forms of buildings, ritual practices, dances, scientific traditions and more. Why should we care about patterns?

Gregory Bateson describes these patterns as blueprints of comprehensible conventions of exchange.[28] They therefore are important for the design of interfaces, which have to refer to

[26] Mindaugas Gapševičius "Machine as a Companion," in *State Of The Art – Elements For Critical Thinking And Doing*, ed. Mari Keski-Korsu et al. (Bioart Society, 2023), 165.
[27] W. Ross Ashby, "Requisite Variety and Its Implications for the Control of Complex Systems," *Cybernetica* 1, no. 2 (1958).
[28] “Mammals in general, and we among them, care extremely, not about episodes, but about the patterns of their relationships. When you open the refrigerator door and the cat comes up and makes certain sounds, she is not talking about liver or milk, though you may know very well that that is what she wants. You may be able to guess correctly and give her that – if there is, any in the refrigerator. What she actually says is something about the relationship between her-self and you: If you translated her message into words, it would be

the nature of those patterns and deal with the *umwelt* they are operating in. Patterns can have a formal persistence across many contexts, but they only take on their meaning — for the respective subject — when they are used as operators in a context. As an artist, I can therefore say that patterns have the ability to offer a structure to the unknown in order to obtain information about an environment and the behaviour of possible subjects living in it.

Before moving on to some examples that exemplify the function of patterns in different contexts, I would like to quote Andrew Pickering, who translates this view of interaction into a kind of worldview that avoids the hierarchies that, as an emphasis of our creative impulse, have created a civilisation that is comfortable for subjects and yet often inhospitable for the environment — not worldfriendly, to come back to Beuys:

> We are indeed enveloped by lively systems that act and react to our doings, ranging from our fellow humans through plants and animals to machines and inanimate matter, and one can readily reverse the order of this list and say that the inanimate matter is itself also enveloped by lively systems, some humans but most nonhuman.[29]

With this sentence, Andrew Pickering draws a "*vision in which both the human and the nonhuman are recognized as open-endedly becoming, taking on emergent forms in an intrinsically temporal 'dance of agency'*."[30]

something like, 'dependency, dependency, dependency'. She is talking, in fact, about a rather abstract pattern within a relationship. From that assertion of a pattern, you are expected to go from the general to the specific – to deduce 'milk' or 'liver'." Gregory Bateson, *Steps to an Ecology of Mind*, (Chandler Publishing Company, 1971), 470.

[29] Andrew Pickering, *The Cybernetic Brain: Sketches of another future* (University of Chicago Press, 2011), 19.

[30] Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (University of Chicago Press, 1995).

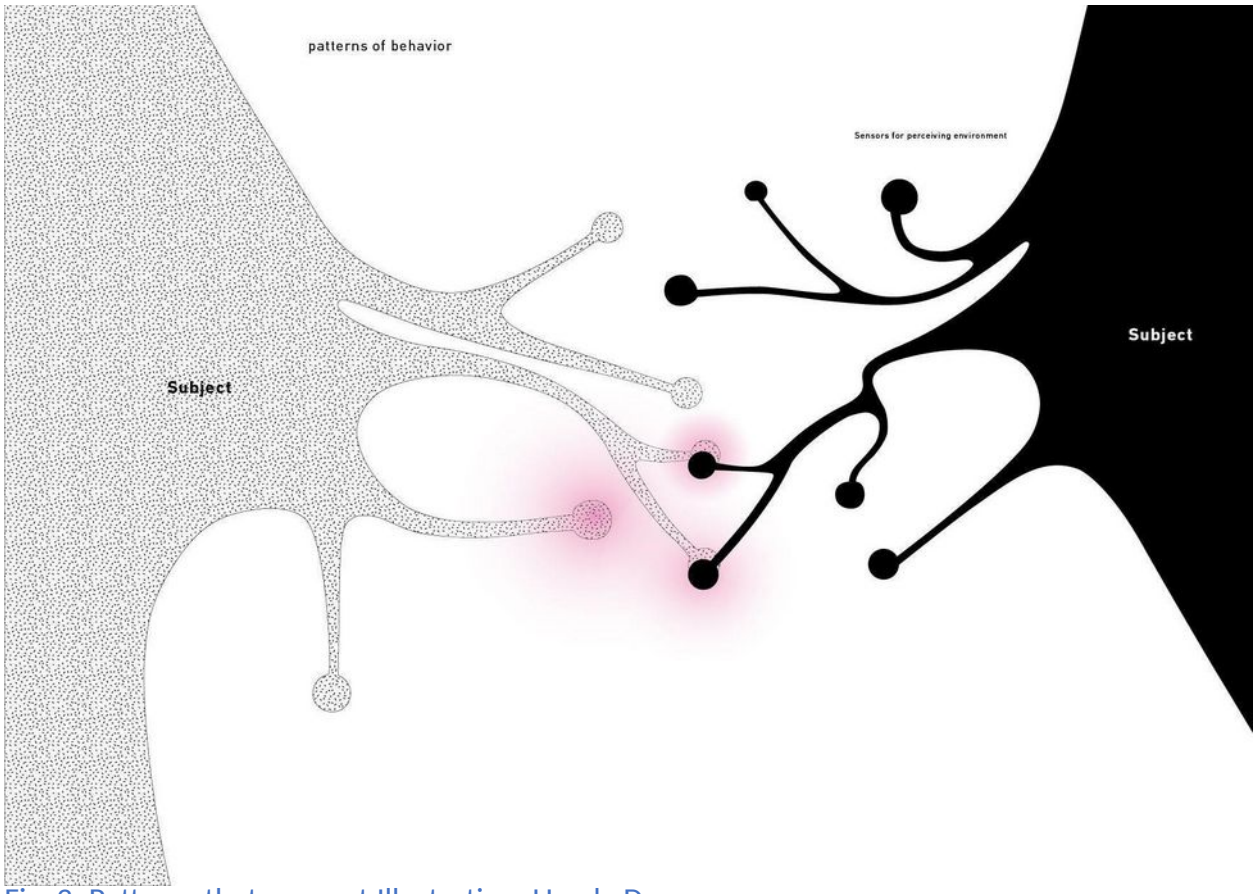


Fig. 3: Patterns that connect Illustration, Ursula Damm

Example 1: understanding other people

When two people dance together (to address Andrew Pickering's dance of agency), it matters what dances they know, have learned, and how they danced before. While dancing together, one even goes beyond what has been learned, as they try to understand the movements of the other — in the context of "dancing" as a habit, a form of inherited custom. In "reading" the other, one draws on knowledge that has established itself as a mode of social custom. But to interact with our counterpart, it is important that we respond directly to the behavior of the other, even if we go beyond the known patterns of dancing. Then new forms of dance emerge, and by recognising the pattern we can even modify it. I would suggest that the patterns as formulated by Bateson might need Pickering's dance of agency and by extending it, could become something flexible, which makes the basic patterns actually performative elements and adaptive tools. Pickering suggested the following: "Maybe we should think of patterns in a double sense: patterns inherent in nature, and patterns established in our couplings with them (choreography as the pattern that connects)."[31]

Example 2: understanding the communication patterns of other species

In the Drosophila melanogaster fly species, song has been reported in the form of pulse song, a pattern in time, which is semantically encoded.[32] This is how Drosophila communicate

[31] Quotation from an email, 25.07.2022

[32] Birgit Brüggemeier et al., "Female Drosophila melanogaster respond to song-amplitude modulations", *Biology Open* 7, no. 6 (2018): DOI: 10.1242/bio.032003.

with each other. To stimulate flies, I draw on these patterns by providing sound encoded with fragments of courtship songs. When we humans sing, these are usually songs that are established in the known methods embedded in the spread of popular songs. But in my installation Drosophila Karaoke Bar, the voice of the human singer is altered with an audio mosaicing to something sounding like drosophila courtship songs mixed with the human voice. In the overlapping area of impulse, the song of the fly and the songs of the people, lies (possibly) the terrain where attentiveness, the preparation of a communication can take place. But for communication, which is always a true learning process, *the form of the patterns must be broken up again*. Therefore, the acoustic vocabulary of the fly is present via the audio mosaicing and provides the singer an orientation toward how a fly could be addressed.

Example 3: looking into the habitat

Humans cannot yet grow lichen, but cryptogamic vegetation — algae, lichens, and mosses — are important for our environment, as they bind huge amounts of nitrogen and carbon dioxide from the atmosphere and thus influence our urban climate: "The metabolism of cryptogamic vegetation accounts for around half of natural nitrogen fixation on land and absorbs as much carbon dioxide as is produced annually by forest fires and biomass combustion."[33]

In 1993, Vernon Ahmadjian described some experiments where lichen were cultured successfully.[34] However, in general, we can say that the growth of lichen is still something hidden to the human mind. Lichen grows everywhere in this world, but humans are still not capable of domesticating, or controlling, the cultivation of lichens. Instead, as lichen grows very slowly, one can explore their living conditions by cartographing the environment — in time — to try to understand why they grow and thrive only in a specific location. This could lead to the construction of spatio-temporal “meshes” to speculatively generate the conditions under which the lichens symbiosis could take place. We might look at Helene Binet’s photography, where she shows natural growth of lichen and algae in a Chinese temple.[35] It makes clear how complex the "reading" of environmental influences can be, and that, in order to identify casualties, one must speculate. What are the patterns here? We have to identify the circumstances of the growth of lichen and to understand the casualties which are generating the symbiosis: these boundary conditions offer patterns to interact with lichen in a more sense-full way rather than simply removing them from wall and floor coverings.

Example 4: aesthetics of a human-pet conversation through the success of human perception of its animal-companion

In the film *Tierische Liebe* by Ulrich Seidel, one can observe how the patterns of interpersonal communication are also present in people's dealings with animals.[36] In the film, examples show that the attention to the animals' reactions often falls short and the

[33] Wolfgang Elbert et al., “Contribution of cryptogamic covers to the global cycles of carbon and nitrogen Nature Geoscience”, *Nature Geoscience* 5, no. 7 (2012): 459-462, DOI: 10.1038/NGEO1486.
[34] Vernon Ahmadjian, *The Lichen Symbiosis* (John Wiley & Sons., 1993), 194.
[35] Helene Binet, “The Walls of Suzhou Garden”, accessed February 27, 2024, https://www.helenebinet.com/photography/the-walls-of-suzhou-garden.
[36] Ulrich Seidl, “Tierische Liebe”, Lotus Film, 1995, 114 min.

interaction is dominated by human habits, reflected by animals. Under the mask of cuteness, the film compiles a long list of miscommunications between humans and animals: we are prompted to ask how understanding and better communication can be established? We remember Beuys and his Koyote-Performance: it is clear that it carries a completely different behavior and aesthetic than the animal-human relationship documented in the Film by Ulrich Seidel. Immediate contact, as claimed by Beuys, listening to the other and observing, seems lacking.

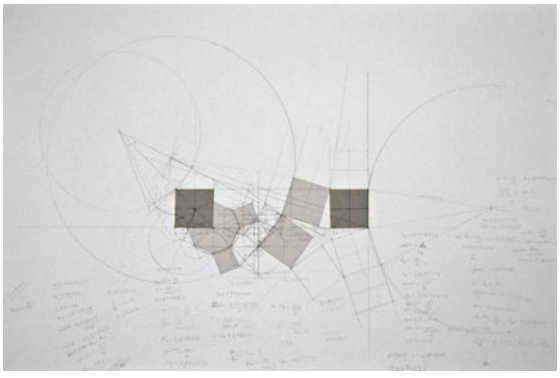
Speaking about the way to connect to animals as patterns makes clear that we are aware of our own behavioral patterns which we established with humans; but that an animal has a different way of understanding than humans is only obvious if we carefully observe the other. We should establish an experimental recursive back and forth process — *a dance of agency* — to abandon our preconceptions. As such, our patterns, a modular framework of behavior, might need to change according to the situation we face and involve behavioral patterns of the species in front of us.

Patterns as a Tool

Why do I think about patterns as an artist? Patterns — in the above-mentioned understanding of Korzybski, namely as ways to understand things — are constructed where our sensory input and our "output", or the actions of perception and response, are happening. Patterns are nourished by both our perceptions and by the way we react to them. Let's remember the semiotic feedback circle of Jakob von Uexküll.
Fig. 4: Jakob von Uexküll, *Theoretische Biologie*, 1920, p. 116

We can see that the new circuit which happens in the brain of the acting creature, determined by the perceptual organ (*Merkorgan*) and operational organ (*Handlungsorgan*), is at the very core of the subject. A pattern connecting the subject with the environment is formed when several feedback circles of action and perception happen. For the patterns, we have the same duality as described by Korbzyski: they exist as a concept/map in a conscious being, or as manifestation of agency in the territory.

An artist's perspective is different from that of a humanities scholar. An artist does not claim to describe facts, but to describe their own subjective state, in which they are placed on the basis of a sensory exchange process. Through observation, the patterns in the territory are — other than the mental state of a creature — graspable as a structure or a repetitive behavior. However, since the world can rarely be captured by a single signal and many signals converge in the brain as well as in our everyday life, we can assume that patterns are aggregations that are formed in the brain either by similarities of impression/perception or by a purpose/action with a specific goal/location in our surroundings.



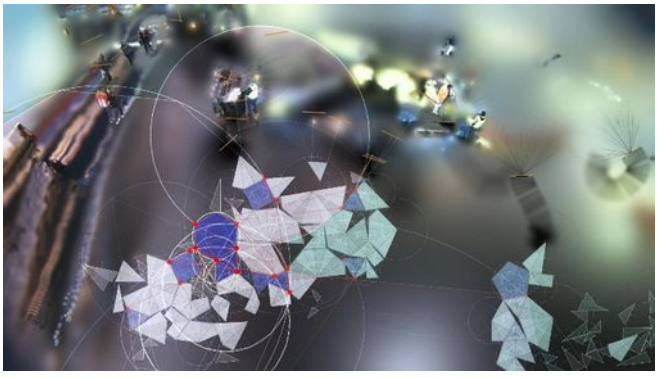


Fig. 5: Ursula Damm, Musterzeichnung 2014
Fig. 6: Screenprint from the Turnstile Installation Düsseldorf 2016

Since 1987, patterns have played a major role in my artistic work. I started by making drawings of patterns. At the same time, I abandoned sculpture and other forms of expressive art making. I was obsessed with the aim to create geometric patterns as a mediator between thinking and perceiving. I hoped that this could be experienced by the audience of my installation Turnstile in Düsseldorf. There, the movement patterns of commuters were, in a bottom-up process, the driving force of a pattern generation, describing the spatial qualities in an aesthetic way. Those pattern formations can also be seen as a tentative form of architecture.

Patterns have become for me a way to deal with the complexity of our environment in a timely and flexible way. In combination with interactivity, patterns can be seen as a temporal, sensitive, and responsive structure; adapting to the conditions of a system. Here we meet Andrew Pickering's definition of his dance of agency which he sees as intrinsically temporal.[37] But more than a “dance of agency” patterns can also become sculpture, architecture, or other artifacts; which, through their constitution as artifacts in a territory, facilitate a change of behavior.

Here it makes sense to mention Christopher Alexander's Pattern language,[38] which has long been a book of inspiration for me. The term pattern language describes an agenda that very accurately describes the fascination towards patterns as I experience them: patterns here go further than being a tool of communication and mediation between a complex external world and one's own subjectivity, they act by establishing a pattern in an environment, which is used by more than one person and has to serve different purposes. Such patterns become manifest and are capable of reinforcing related actions.

The patterns described by Christopher Alexander — settlement forms, assemblages of functional elements in architecture and rural planning — were at the same time disappointing in their (old fashioned) outlook as they were inspiring. To think of architecture as a form of software, providing a set of modular solutions according to the needs of the customers/inhabitants, seemed to be a way to make architecture more democratic and less available to the hands of capital.

But the software solutions to address architecture so far, for example, Turnstile and SEEK, both only related to video input to understand an environment and how the actors deal with it. My suggestion would be to address a combination of sensorial inputs, environmental conditions, and — very important — to use a (re-)active interface in the territory itself: nourishing the system which makes the decisions of what to envision as an intervention towards an interactive architecture.

Fernfuehler, a concept I worked on in 2007, can be seen as a tentative, very early project for the processes of dwelling and settling.[39] There, a chair becomes a neuron of a network and

[37] Pickering, *The Mangle of Practice: Time, Agency, and Science*.
[38] Christopher Alexander et al., *A Pattern Language: Towns, Buildings, Construction* (Center for Environmental Structure Series) (Oxford University Press, 1977).
[39] Ursula Damm, “Fernfühler: Interactive furniture for public places”, 2007, accessed February 27, 2024, https://ursuladamm.de/fernfuehler_concept/.

gathers information to make a space intelligent. This setup can be seen as a consequence of our previous AI work, *memory of space*, which was working with video input and analyses made with videodata on the computer. We understood that a meaningful learning algorithm would require feedback from the “territory” (in the understanding of Korzybski) and the observed area itself, alongside examining the reaction of passengers to the proposed settings — as objects which can be used and have their function altered by non-machines.

And that is what I would like to state here: if we ask the question of what the world looks like from the perspective of a machine, we must give the machine agency to make changes to the object, the situation about which it makes statements, its own environment; and, in doing so, it has the possibility to gain knowledge about the occurrences in the territory *in a recursive process***.** Otherwise, the machine remains trapped in data sets whose origin and fair composition (bias) we must constantly question. The network topologies of the machine's AI should be able to reconfigure according to the environments in which they may provide orientation and cause change.