The Blindness Paradigm: The Visibility and Invisibility of the Body

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Abstract:

This paper focuses on the theoretic issues of the collaborative project *Canções dos Olhos* (Paulo C. Chagas - composition, Johannes Birringer - choreography and video, Veronica Endo - dance) in the context of Interaktionslabor, a laboratory for interactive media, sound, design, digital video, telecommunications and performance, taking place on the site of the former coal mine Göttelborn, Germany. The work, inspired by the novel "Blindness" by José Saramago, explores the cognitive and aesthetic dimensions of blindness in terms of embodiment experience. The project was conceived as an "intermedia" song cycle resulting in a DVD and an audiovisual installation. Compositional elements include voice (soprano), processed voice, dance and digital film. Based on the experience of *Canções dos Olhos*, this paper addresses questions of both the visibility and invisibility of the body in the autopoietic process of generating electro-acoustic and digital music, and reflects on the relationship between technology and embodied human interaction in artistic collaboration.

Keywords: body, embodiment, autopoiesis, interactivity, intermedia, electroacoustic music, digital music

To see
the visible
but not to see
the blindness
of the visible

1. Visible and invisible world

The Portuguese author and Nobel Prize winner José Saramago describes in his novel "Blindness" (1995) – original title: *Ensaio sobre a Cegueira* – the scenario of a fictional, contemporary city where all the people go blind. The city has no name and there is no apparent reason for the collective blindness that affects the population. It comes on suddenly. The first victim is a man who loses his vision while in his car waiting for a traffic light to change. Then the blindness spreads out very quickly as an infectious disease. The public authorities put all the blind people in a former mental hospital, trying to isolate them. Soldiers keep watch of the internees and shoot anybody who attempts to escape. The blind are provided food but nothing else. They have to adapt their lives to this new environment. The mental hospital very quickly becomes overpopulated, dirty and violent. Some criminals have guns and take advantage of the situation: they make people pay for the food and sexually abuse the women. A revolt ensues. A woman takes revenge and kills the man who raped her. As the food supply dwindles, the blind realize that the entire population of the city also went blind. They begin leaving the mental hospital. Outside the situation is not better. The blind find a devastated landscape. The infrastructure and economy have collapsed, nothing functions: no electricity, water, communication, transportation and so forth. Blind people perambulate through the streets struggling for food. Life is reduced to the basic instinct of surviving; there is a state of collective despair. Suddenly, when all hope seems to have vanished, everybody is able to see again. The lack of vision ends as abruptly as it had begun. Nothing explains the collective experience of blindness.

Saramago's literary metaphor of blindness points to the vulnerability of our society. We live at the edge of chaos and no social system guarantees civilization. Barbaric aspects of contemporary life easily reveal themselves, as we recently saw when Hurricane Katrina devastated the US city of New Orleans. It is not just about dealing with natural disasters and terrorism. The main threat our society faces is collective blindness – when we lose the ability to see, when the visible disappears in front of our eyes, when society itself becomes blind. How can we communicate our thoughts and emotions when we are blind

to each other? The only character in Saramago's novel, who apparently is not affected by the blindness, is the ophthalmologist's wife. Although she is not blind, she follows her husband into the mental hospital and, without revealing that she has the ability to see, continues to help those who lost their vision. The woman who sees is Saramago's invisible narrator. She makes the blindness visible. Otherwise who could tell the story of the blindness? "I can see, I can see", the people in the street shout and sing, after recovering their vision. But why did they become blind in the first place? Did they really go blind? At the very end of the novel Saramago touches on the ambiguity which traverses the story since the very beginning: "Do you want me to tell you what I think, Yes, do, I don't think we go blind, I think we are blind, Blind but seeing, Blind people who can see, but do not see" (Saramago 1997: 326).

2. Visible and invisible body

Saramago's "Blindness" plunges us into the aftermath of our own blindness. We cannot avoid associating the breakdown of the social system, as described in the book, with some of our personal experiences. While reading "Blindness" I reconstructed my own experience as a 17 years old imprisoned during the Brazilian military dictatorship in 1971. I was arrested for having collaborated with opposition groups. Arriving in the military prison I was put in the "fridge". It was a small room, acoustically isolated, completely dark and cold. Different kinds of noises and sounds – such as hauling oscillators, rumbling generators, distorted radio signals, motorcycle-like sounds, etc. – blasted from loudspeakers, invisible behind the walls. The electronic sounds filled the dark space and overwhelmed my body for three long days, uninterrupted: raw sounds, loud sounds, piercing sounds, disturbing noises. After a certain time I lost consciousness. The auditory and acoustic torture I had been exposed to was, back then, a recent development. It partially replaced traditional methods of physical coercion that killed thousands of people in Latin American prisons between the 1960's and 1990's. The sounds injure the body without leaving any visible trace of damage. The immersive space of the torture cell, soundproofed and deprived of light, resonates in my memory as the perfect environment for experiencing the power of sound embodiment.

In such an extreme situation it becomes evident that the body cannot escape the auditory and acoustic sensory experience. The sound traverses the molecules and deterritorializes the cognitive and physical domains. The torture cabin would not have been so effective if the body had been exposed to visual stimuli. Compared to visual perception, sound has a higher coefficient of deterritorialization, which, as Deleuze and Guattari argue, comes from a "phylogenetic" line. The machinic phylum that operates on sound has the ability to impose their cognitive patterns on the body's responses, for example pleasure and pain. It accounts for the great ambiguity of the musical experience: "sound invades us, impels us, drags us, transpierces us. It takes leave of the earth, as much in order to drop us into a black hole as to open us up to a cosmos. It makes us want to die" (Deleuze & Guattari 1987: 348).

The philosophic vision of music articulated by Deleuze and Guattari is related to Schopenhauer's conception of the "world as will". Music embodies the will and is opposed to the universe of images, which belongs to the domain of representation, claims Schopenhauer (1958). In a similar way, Deleuze and Guattari account that the essence has to be found "in the molecular domain of transverse becomings" (Bogue 2003: 16). Music arises in the "territories" which are formed by "milieus" and "refrains" as the "creative, active operations that consists on deterritorializing the refrain" (1987: 300). The notion of refrain refers to any kind of rhythmic pattern that marks a territory, whereby the notion of rhythm itself should be understood as a qualitative *difference*, a relationship between "milieus". And in the same way that music has a strong force of deterritorialization, it also has the powerful ability of reterritorialization. Bodies can be reconstructed through acoustic vibrations, trumpet signals can move armies into battle (Deleuze & Guattari 1987: 348), today hip hop music played by ipods prompts the bones and muscles of athletes and soldiers preparing them for competitions and battles; music tunes the body for great accomplishment; music collects and destroys forces. This overwhelming power of embodiment accounts for the "potential fascism of music" (1987: 348).

In addition to being a motor for war machines, music and sound embodiment can drive sacrifices and processes of trance and possession. In the book *La musique et la transe* Gilbert Rouget argues that musical vibrations are palpable movements that convey an immediately material and concrete experience (Rouget 1990: 230). Vibrations are perceived as transformations of objects that are affected by sound, including both the objects that produce the sound and the objects that vibrate as a result of the sound waves. The human body is such an object. Exposed to sounds produced by drums in the secret ceremonies of *oro* of the Yoruba from West Africa, Rouget describes different kinds of perceptions in different parts of the body. For example, the large drums are perceived through vibrations of the belly and the small drums through the vibrations of the head (Rouget 1990: 231). Truax proposes a model of acoustic communication based on the opposition between sound and meaning which is mediated by the sonic structure (Truax 2001: 55), whereby he distinguishes between the sound energy produced by sound waves and those produced by electric signals. Such a model of musical communication justifies the opposition between "performing" and "listening bodies – i.e. bodies that are respectively actively and passively involved in the musical experience. However, I believe that this opposition does not account for the complex processes of decoding and recoding – deterritorialization and reterritorialization –that undergo the reorganization of functions and the regrouping of forces by the musical cognition. Rather than a response to external impulses, sound sensations should be considered a process of embodiment, which is not necessarily related to the physical presence and function of bodies. Distinctions between performance and listening are just operational descriptions of relations. Performing requires listening and listening requires performing. As Rouget argues, music activates "external" and "internal" sound sensations. By singing, for example, we feel the vibrations spreading from the throat to the neck, face, thoracic cavity, and the abdominal and pelvic regions. Music is at the same time an "animation of things and a palpitation of the being" (1990: 231). Rouget proposes to articulate the two different kinds of impact music exerts on the body as a distinction between "acting" and "undergoing". Again: this opposition should not be understood as a distinction between performing and listening, but as different operations of bodies involved in the process of *observing* music.

The concept of *observation*, as I use it here, has to be understood as the operation that draws a distinction and creates form (Spencer-Brown 1969).[1] In fact, the different ways of perceiving sound and music – such as physiologically, psychologically, affectively, aesthetically, etc – can be reduced to the operation of *observation*, through which systems interact with their environment. Autopoietic living machines, such as human beings, are closed systems and cannot establish any contact with their environment. They can only operate in the recursive realm of their own boundaries.[2] The cognitive operations of perception are determined by the operational mode of the sensory-motors apparatus (consciousness), which creates a distinction between self-reference (inside) and hetero-reference (outside) (Luhmann 2000: 9). According to Luhmann, the distinction between "inside" and "outside" is processed simultaneously and remains internal to the system. When we observe sounds – it doesn't matter if we are producing sounds or listening to sounds, or even writing about sounds – we distinguish between bodies and vibrating systems. But what we call vibration is only the boundary that marks the difference between our bodies and the world, a combination of self-reference – the perception of the "inside" – and hetero-reference – the perception of the "outside". Music emerges in the system of art as a structural coupling between perception and communication, through which acoustic sensations are correlated to meaningful structures of communication observed in the social system. Works of music and everything said and written about them are observations. The perception of and the communication about the work of music are elements of an autonomous and closed system that can only reproduce its own operations. There is no "transmission" of information between living systems and social systems.[3]

3. Visible and invisible machine

Digital technology is considered to be responsible for a significant transformation of the perception of the body. Electronic processes connecting bodies to computers and other such digital devices produce sound, images, dance, language and other artistic forms, which account for the variety of aesthetic and performance contexts in the social system.

Concepts such as “virtuality” and “interactivity” emerge in post-humanistic discourse and practice as two opposite poles of the relationship between body and technology.[4] On the one hand, virtuality refers to the idea that the body becomes invisible and, on the other hand, interactivity conveys the idea that the body becomes visible. The discourse of virtuality emphasizes the disembodiment of information, the fragmentation of the physical world through the manipulation of digital data, the simulation as an ersatz of the experience (Virilio 1988; Baudrillard 1995). The discourse of interactivity stresses the embodiment of information, the material interface between bodies and digital machines and the emergence of the transmedial cognitive and affective experience (Hayles 1999; Hansen 2004; Birringer 2005b).[5]

An important shift has been made in the last years from the structuralist approach, which establishes a separation between information and meaning and conveys the conception of information as a disembodied entity (Shannon 1948; Wiener 1961), to a phenomenological approach of cognition as a process involving “multiple levels of interconnected, sensorimotor activity that shapes a world” (Varela & Thompson, Rosh 1991: 206). This approach, defined as *enaction*, is opposed to the idea of *representation*, which has been the paradigm on informatics and cybernetics of the first order (Foerster 1981, 1993, 2002; Hayles 1999) and is still referenced in research on artificial intelligence.[6] The enactive approach views cognition as embodied action, as a *structural coupling* between systems that reflect each other’s histories and make possible the emergence of a world. Embodiment is the domain of interactions between autonomous systems that are in principle closed and communicate only through self-reference but can undergo transformations when structurally coupled. This domain of interactions is the being-in-the-word of cognition. It cannot be reduced to the notion of body as a physical entity, such as the structure of bones and muscles or electronic circuits.

Musical embodiment can be analyzed through the lens of performance and listening, aspects of music which are most affected by the deterritorialization/reterritorialization vectors of the electronic and digital machinery.[7] Musical embodiment is a temporal

experience that requires the *synchronization* of temporal *objects* and *events*.[8] In traditional musical practices, such as the Yoruba drums ensembles or Western symphony orchestras, the presence of performers and listeners who physically share the same time and space provide the framework for the synchronization. This mode of embodiment creates the unique "aura" of the work of music, which according to Benjamin (1977), has been eliminated by mechanical reproduction. By re-interpreting Benjamin (maybe the most cited author in New Media Studies) through the concept of Deleuze and Guattari, the loss of the aura becomes a process of deterritorialization/reterritorialization through which the matrix of performance/listening becomes *invisible,* and the medium of technology, *visible*.

Different notions of form arise from the relationship between body and media. For example, Hayles' operative distinction between *body* and *embodiment* as different domains of interaction (Hayles 1999). The body, according to Hayles, is an abstract idealized form, a discursive universal construct; the embodiment, on the other hand, is always "contextual, enmeshed with the specifics of place, time, physiology, and culture, which together compose enactment" (1999: 196). Hayles' reflection accounts for the ambiguity of the posthuman condition. The discourse holds both an apocalyptic and optimistic vision of the world, a world inhabited by humans and machines and other life-forms. She relates the distinction between body and embodiment to other operational distinctions such as inscription/incorporation and pattern/randomness (1999: 198-199). A similar approach has been developed in music theory with other distinctions such as periodicity/aperiodicity (Pousseur 1970: 241-290) and sound/noise (Atali 1985). In fact, binary categories belong to the domain of the observer and indicates the possibility of recursively re-entering the distinction system/environment into the form of the distinction itself.[9] The form, as defined by Luhmann, is not an ontological definition of objects, states or *Gestalten*, but the operation that establishes a *difference* in the world and draws a boundary between a marked and an unmarked space. The environment is the medium; the system is the form. The environment is the domain of invisibility, a loose coupling of elements; the form is the domain of visibility, a tight coupling of the elements.[10] As I argued before, system and environment are closed domains that interact only through

structural coupling. The world itself "remains invisible even when, as precisely when, it is laced with forms" (Luhmann 2000: 33).

The visibility of music, rather than incorporated in the materiality of sound, emerges from the gesture of performance. The concept of gesture is not necessarily related to the "purposive movement of the human body" (Wittgenstein 1980: 42e) but to the *understanding* of form. "Architecture is a gesture", claims Wittgenstein (1980: 42e), and sometimes a gesture can be the simplest way to "understanding and explaining a musical phrase" (1980: 69e). Following Wittgenstein, we can define gesture as the form that makes visible the invisibility of musical understanding. Flusser (1994) sees, in the gesture of listening to music, the logical matrix of the fertilization of matter through the spirit (*Geist*). The gesture of listening, for it expresses the transformation of both "body in music and music in body" (Flusser 1994: 155), shows the embodiment of mind and thinking, claims Flusser. Vocal and instrumental gestures are analogue models activated by the synchronization of performers and listeners. A vocal gesture consists of a physical and metaphysical effort, a projection of an identity (*Dasein*) in some other context (Tarasti 2002: 157). Instrumental gesture requires a synchronized action between body and object. Both vocal and instrumental gestures are ritualizations of *myths*, which are coupled with a medium, such as orality and acoustics. By contrast, gestures in electroacoustic and digital music are ritualizations of *programs* (Flusser 1983; 2000)[11], which emerge as transmedial (or intertextual) couplings of different media: sound, noise, language, space body, machine, etc. Vocal and instrumental gestures account for the visibility of the gesture of performance; electroacoustic and digital gestures make the gesture of performance invisible.[12]

The invisibility of performance remains one of the main controversial aspects of electroacoustic and digital music. This problem has been haunting composers since the beginning of "tape" music in the 1950s. Cage made very accurate observations in the beginning of the 1960s, pointing to the problem as well as foreseeing the solution: "… the most important thing to do with electronic music now is to somehow make it theatrical … by introducing live performance elements. That is to say, people actually

doing things … [and] the actual, visual manipulation of the machines, to begin with; the distinct giving to the audience of the impression that something is happening then which is unique to that particular experience" (Ascott 2003: 124).[13] The theatrical dimension, as suggested by Cage, implies that electroacoustic and digital music has to deterritorialize/reterritorialize the experience of *temporality* – which traditionally became apparent through the synchronization of performance and listening – by structural coupling of the medium "sound" with other "media". The sensorimotor embodiment, according to enaction, requires "a frame or window of simultaneity that corresponds to the duration of lived present" (Varela 1999: 272). Varela's phenomenological approach accounts for the emotional motivation that engages any cognitive action including listening. Affect is the dispositional orientation that coordinates different scales of temporality and makes possible the experience of simultaneity (1999: 300), which is crucial for music. Vocal and instrumental sounds are *transparent*; they make visible the flow of gestures – including gestures of affects – that configure the embodiment of the musical experience. On the other hand, electroacoustic and digital signals are *opaque*. They break the transparency of the musical flow, block the experience of simultaneity and thus, the disposition of affective experience. In other words: electroacoustic and digital music has to compensate blindness by inventing new forms that emphasize sonic sensory qualities – such as visual, tactile, textural, spatial, etc. – and stimulate, as Cage said, the "involvement in the behavior of performers and the musical 'machines'" (Ascott 2003: 124).

4. Visible and invisible interactivity

The visibility and invisibility of the body is the central issue of *Canções dos Olhos* (*Augenlieder*), a composition for soprano, processed voice, dance and digital image created in collaboration with the choreographer and media artist Johannes Birringer and the dancer Veronica Endo. The work was developed in a period of two weeks (July 18-31, 2005) in the "Interaktionslabor", an international workshop founded and directed by Birringer in 2003 on the site of the former coal mine of Göttelborn, Saarland, Germany. After the elimination of mining activity in the 1990s, which plunged the region into a

crisis of chronic unemployment, the local government set up an initiative to attract high-tech companies to the abandoned mine. The recycling of the industrial landscape gave birth to the project of the "future cité", a post-industrial living environment shaped as a network of individuals and machines sharing the dream of a telematic society (Flusser 1985). The Interaktionslabor emerged inside this dream as a self-organizing "laboratory for interactive media, sound, design, digital video, telecommunications and performance" (Birringer 2005, 2005a).[14] Since 2003, it has promoted an annual summer workshop by inviting groups of artists, scientists, engineers, etc. – from Europe, North and South America and Asia. They live for two weeks in the region (since 2005 in the site of the mine) and work on individual and collaborative projects in which digital media and interactive performance is coupled with specific qualities of the physical environment. The artistic activities of the Interaktionslabor are experiences of deterritorialization and reterritorialization. They generate meaningful structures for the possibility of converting a post-industrial society into a utopia of the information society, the living network towards which many of our personal dreams converge. In this sense, the Interaktionslabor is the structure that makes visible the possibility of dreaming – it is the visibility of the "future cité" itself.

I had previously explored the novel "Blindness" in my former project for the Interaktionslabor 2004– *Ensaio sobre a Cegueira* (Blind City) – a model for an interactive opera-installation, that "focused on the haptic and the auditory, seeking to displace proprioception from vision, make us 'see' without seeing" (Birringer 2005a). In the conception of *Canções dos Olhos* (*Augenlieder*) for the Interaktionslabor 2005, I revised Saramago's narrative, focusing on the operational distinction between visibility and invisibly. Inspired by Schubert's *Winterreise*, I imagined a cycle of "intermedia songs" exploring the relations between sound, image and dance in the unique environment of the mine.[15] The song cycle focuses on the character of the doctor's wife – performed by the dancer – the only person that apparently can see in the virtual city where everyone else has gone blind. Her story is not told as a linear narration, but as an invisible layer of fiction that "actively probes the spaces between the different medias" (Higgins 2002: 91).

The intermedia approach of *Canções dos Olhos* reflects on the autopoiesis of the artistic creation itself, the invisible forces that drive experiences of exchange, collaboration, communication and interaction between human beings and machines. In opposition to the discourse of interactivity as a connection between bodies and digital interfaces, I define interactivity as the *embodiment of the collaborative experience that materializes the creation process in the form of the work itself*. The paradigm of "interactivity", as Flusser argues in his prophetical book *Ins Universum der Technischen Bilder* (1985), is the chamber music (Flusser 1985: 173-181).[16] Following the theory of autopoietic systems, there is no and there cannot exist any "interactivity" between human beings and machines, because they operate in different living domains, which are operationally closed to each other. Interactivity is a being-in-the-word and not an ensemble of devices or patches that we put together. Interactivity is a form of synchronization of systems, which cannot distinguish between perception and communication, and therefore cannot communicate. There is no possible communication between a human being and a computer; only communication can communicate.[17]

The main issue of artistic creation today, in my opinion, is how to shape a *dialogue* process between different kinds of systems, processes in which the different systems operate as partners and not in a hierarchical structure. The problem becomes evident when we observe the existing uses of technology by society, particularly by digital artists. We observe people making sounds, dancing for cameras, tracking data with sensors and playing with interfaces, but no interactivity develops if no dialogue occurs between the systems operating in that particular time and space. What we usually see is either the machine dominating the human being or the human being using the machine as a slave for her/his purpose. In fact, we reproduce in our relationship with technology the same patterns of oppression and exploitation that inherently drive capitalist and imperialist systems.

There is definitely a need for ethical and moral reflection on the "new" theories of "digital phenomenology". "Interactivity" is mostly interpreted as a synonym for computer calculation and justified as *projections* for the future. However, as Flusser says, “the

futuristic computer devoured the future. To predict the future is to destroy the future with the purpose of preventing catastrophes" (1985: 173-174).[18]

Since the 9/11 attacks against the Empire,[19] technology development has been focused on "security" against the global threat of terrorism. Ironically, these new developments do not protect us at all. Instead, they accelerate our capability for self-destruction. We were all witnesses to the powerful disintegration of the US social system after the Hurricane Katrina catastrophe. This was only a small model of disintegration, but it shows very clearly how fast a system can collapse. This is also apparent in the development of robots and uninhabited vehicles for replacing soldiers during military conflicts. There is a strong tendency to make the body invisible through the development of technologies that are suppose to protect us from physical destruction. The suicide bombers from Baghdad and the Gaza Strip also create a dimension of "invisibility" when their bodies are used as weapons for the destruction life and properties. This kind of visibility is driven by the belief in the superiority of a particular (religious) conception of God. The former one is driven by the belief in the superiority of technology, that it can enable the body to disappear behind computer systems, making it unattainable to our enemies. Both forms of invisibility are motivated by the same kind of operations. And this is our problem.

References:

1 Spencer-Brown's concept of form is an imperative demand: "draw a distinction" (Spencer-Brown 1969: 3). See also the analysis of Spencer-Brown's logic in Baecker (1999).

2 The theory of autopoiesis was formulated by the neurobiologists Humberto Maturana and Francisc Valera. See: Maturana, & Varela (1980, 1987) and Varela (1979). For a critical approach of the theory of autopoiesis and its developments in different fields see: Mingers (1995).

3 Luhmann developed the analysis of the functional subsystem of art in several articles (for example: Luhmann 1986a, 1986b, 1994) and in the book *Die Kunst der Gesellschaft* (1995), which has been translated into English (Luhmann 2000). Luhmann formulated his theory of social systems at different stages. An early version is described in the book *Soziale Systeme. Grundriß einer allgemeinen Theorie* (1984), which has been translated into English (Luhmann 1995). A later version can be found in the book *Die Gesellschaft*

der Gesellschaft (Luhmann 1997), from which there is no English translation. For an introduction of Luhman's theory of autopoietic social systems see (Luhmann 1990).

4 Most of the new theories or philosophies of "new media" are focused on visual arts and offer very little, if no insight, to the acoustic domains of artistic creation. For example: Manovich (2001) and Hansen (2004).

5 For an analysis of the evolution of music and sound art from the age of reproducibility to the age of connectivity, see Chagas (2003a).

6 Rodney Brooks takes a different approach to AI in his research in the AI laboratory at MIT. Varela describes it as enactive AI. See Brooks (2002) and Varela, Thompson & Rosch (1993: 208-212).

7 Guattari introduces the concept of "machinic subjectivity" for describing the impact of machines of information and communication technology on human subjectivity. See Guattari (1992: 11-52).

8 For an analysis of the role of temporality in cognition, see Varela (1999).

9 For distinction on system and environment see Luhmann (1984: 35f, 242f,) and Luhman (1997: 60f). For the concept of re-entry see Spencer-Brown (1969: 69-76) and Baecker (1999: 1-14).

10 The distinction medium and form is discussed in Luhmann (1986b, 1997, 2000: 102-132). For an application in the musical domain, see Chagas (2003b).

11 Flusser developed the notions of "myth" and "program" as models of communication in the book *Für eine Philosophie der Fotografie* (1983). English translation: Flusser (2000). Later he developed a model of cultural evolution in five stages. See Flusser (1985: 9-15).

12 For a phenomenology of vocal, instrumental and electroacoustic gestures inspired by Wittgenstein and Flusser, see Chagas (2003b)

13 Interview with John Cage quoted from: Reynold, Roger. (1962). Interview. Generation, January

14 See also the web site of the "Industriekultur Saar" which administrates the recycling project and supports the Interaktionslabor. Retrieved October 30, 2005, from http://www.iks-saar.de/iks_rc2/start.php?lang=de&selection=9999.

15 The term "intermedia" was first used by Dick Higgins in 1966, in the context of Fluxus. Higgins allegedly borrowed the idea from Samuel Coleridge (1812). See Higgins (2002: 91-93).

16 Flusser argues that chamber music is a model of dialogue communication similar to the telematic society, where people are devoted to the creative exchange of information in a not-hierarchical network (1985: 177). According to Flusser, the universe of music is made of calculations and computations and anticipates the universe of the technical images (1985: 179).

17 According to Luhmann, social systems are not comprised of persons and actions but of communications. “Social systems use communication as their particular mode of autopoietic reproduction. Their elements are communications that are recursively produced by a network of communications and cannot exist outside of such a network. Communications are not “living: units, they are not “conscious” units, they are not ‘action’” (Luhmann 1990: 3)

18 “Der futurisiende Computer hat die Zukunft verschlungen. Futurisieren ist Zukunfsvernichtung mit dem Ziel, Katastrophen zu verhüten". Flusser (1920-1991) was a polyglot and who often invented words to express his ideas, particularly in the German language, where new concepts can be easily created by joining two or more words with a single word.

19 The Empire is not a specific place; its boundaries are not defined by geography, but drawn inside a social system.

Bibliography:

Ascott, Roy. (2003). Telematic Embrace: Visionary Theories of Art, Technology, and Consciousness. Berkeley, CA: University of California Press.

Atali, Jacques. (1985). Noise: The Political Economy of Music. Translated by Brian Massumi. Minneapolis: University of Minnesota Press.

Baudrillard, Jean. (1995). Simulacra and Simulation. Translated by Sheila Maria Glaser. Ann Arbor: University of Michigan Press.

Baecker, Dirk (Ed.). (1999). Problems of Form. Translated by Michael Irmscher with Leah Edwards. Stanford, CA: Stanford University Press.

Benjamin, Walter. (1977). Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit. In S. Unseld (Ed.), Walter Benjamin. Illuminationen (pp. 136-169). Frankfurt am Main: Suhrkamp.

Birringer, Johannes. (2005). Interaktionslabor. Retrieved October 30, 2005, from http://www.interaktionslabor.de/

Birringer, Johannes. (2005a). FutureHouse, Blind Mine. Retrieved October 30, 2005, from http://art.ntu.ac.uk/performance_research/birringer/bibl.htm

Birringer, Johannes. (2005b). Performing Art Performing Science. Retrieved October 20, 2005, from http://art.ntu.ac.uk/performance_research/birringer/bibl.htm

Bogue, Ronald. (2003). Deleuze on Music, Painting, and the Arts. New York: Routledge.

Brooks, Rodney. (2002). Flesh and Machines: How Robots Will Change Us. New York: Pantheon Books.

Chagas, Paulo C. (2002). Spiel und Dialog: das Komponieren mit Apparaten. In E. Ungeheuer (Ed.), Elektroakustische Musik. Handbuch der Musik im 20. Jahrhundert Band 5 (pp. 182-196). Laaber: Laaber-Verlag.

Chagas, Paulo C. (2003a). Virtuality and Metadesign: The Sound Art in the Age of Connectivity". In Proceedings of The Ninth Biennial Symposium on Arts and Technology (pp. 24-35). New London, CT: Connecticut College.

Chagas, Paulo C. (2003b). La distinction entre médium et forme: une nouvelle approche de la sémiotique musicale. In Proceedings of The Tenth Journées d'Informatique Musicale. Montbéliard: École Nationale de Musique.

Chagas, Paulo C. (2003c). Gesture in electroacoustic music: vocal, instrumental and technological". International Conference: Music and Gesture. University of East Anglia, Norwich, U.K

Deleuze, Gilles & Guattari, Félix. (1997). A Thousand Plateaus: Capitalism and Schizophrenia. Translated by Brian Massumi. Minneapolis: University of Minnesota Press.

Flusser, Vilém. (1985). Ins Universum der technischen Bilder. Göttingen: European Photography.

Flusser, Vilém. (1994). Geste: Versuch einer Phänomenologie. Frankfurt am Main: Fischer.

Flusser, Vilém. (2000). Towards a Philosophy of Photography. Translated by Anthony Mathews. London: Reaktion Books.

Foerster, Heinz von. (1981). Observing Systems. Seaside: Intersystems Publications.

Foerster, Heinz von. (1993). KybernEthik. Berlin: Merve.

Foerster, Heinz von. (2002). Der Anfang von Himmel und Erde hat keinen Namen: eine Selbsterschaffung in 7 Tagen. Karl H. Müller & Albert Müller (Ed.). Berlin: Kadmos.

Guattari, Félix. (1992). Chaosmose. Paris: Galilée.

Hansen, Mark B. N. (2004). New Philosophy for New Media. Cambridge, MA: The MIT Press.

Hayles, N. Katherine. (1999). How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics. Chicago: The University of Chicago Press.

Higgins, Hannah. (2002). Fluxus Experience. Berkeley, CA: University of California Press.

Luhmann, Niklas. (1984). Soziale Systeme. Grundriß einer allgemeinen Theorie. Frankfurt am Main: Suhrkamp.

Luhmann, Niklas. (1986a). Das Kunstwerk und die Selbstreproduktion der Kunst. In H. U. Gumbrecht & K. L. Pfeiffer (Eds.), Stil. Geschichten und Funktionen eines kulturwissenschaftlichen Diskurselements (pp. 620-672). Frankfurt am Main: Suhrkamp.

Luhmann, Niklas. (1986b). Das Medium der Kunst. In O. Jahraus (Ed.) N. Luhmann (2001) Aufsätze und Reden (pp. 198-217). Stuttgart: Reclam.

Luhmann, Niklas. (1990). The Autopoiesis of Social Systems. In N. Luhmann. Essays on Self-Reference (pp. 1-20). New York: Columbia University Press.

Luhmann, Niklas. (1994). Die Ausdifferenzierung des Kunstsystems. Bern: Benteli

Luhmann, Niklas. (1995). Social Systems. Translated by John Bednarz, Jr., with Dirk Baeker. Stanford, CA: University of Stanford Press.

Luhmann, Niklas. (1997). Die Gesellschaft der Gesellschaft. Frankfurt am Main: Suhrkamp.

Luhmann, Niklas. (2000). Art as Social System. Translated by Eva M. Knodt. Stanford, CA: University of Stanford Press.

Manovich, Lev. (2001). The Language of New Media. Cambridge: MIT Press.

Maturana, Humberto R. & Varela, Francisco J. (1980). Autopoiesis: The Realization of Living. Boston Studies in the Philosophy of Science, vol. 42. Boston: D. Reidel.

Maturana, H. R. & Varela, F. J. (1987). The Tree of Knowledge: The Biological Roots of Human Understanding. Boston: Shambhala.

Mingers, John. (1995). Self-Producing Systems. Implications and Applications of Autopoiesis. New York; London: Plenum Press.

Pousseur, Henri. (1970). Fragments théoriques sur la musique expérimentale. Bruxelles: Université Libre de Bruxelles.

Rouget, Gilbert. (1990). La Musique et la Transe. (2nd ed.). Paris: Éditions Gallimard.

Saramago, José. (1997). Blindness. Translated by Giovanni Pontiero. San Diego: Harcourt.

Schopenhauer, Arthur. (1958). The World as Will and Representation. Translated by E. F. J. Payne. Indiana Hills, CO: The Falcon's Wing Press.

Shannon, Claude E. (1948). A Mathematical Theory of Communication. The Bell System Technical Journal 27: 379-423, 623-656. Retrieved October 20, 2005, from http://cm.bell-labs.com/cm/ms/what/shannonday/shannon1948.pdf

Spencer-Brown. (1969). Laws of Form. London: George Allen & Unwin.

Tarasti, Eero. (2002). Signs of Music. A Guide to Musical Semiotics. Berlin: Mouton de Gruyter.

Truax, Barry. (2001). Acoustic Communication [2nd ed.]. Westport, CT: Ablex Publishing.

Varela, Francisco J. (1979.) Principles of biological autonomy. New York: North Holland.

Varela, Franciso J. (1999). The Specious Present: A Neurophenomenology of Time Consciousness. In J. Petitot & F. J. Varela, G. Pachoud, Jean-Michel Roy (Eds.) Naturalizing Phenomenology: Issues in Contemporary Phenomenology and Cognitive Science (pp. 265-314). Stanford, CA: Stanford University Press.

Varela, F. J. & Thompson, E., Rosch, E. (1991). The Embodied Mind. Cambridge, MA: The MIT Press.

Virilio, Paul. (1988). La machine de vision. Paris: Galilée.

Wiener, Norbert. (1961). Cybernetics: or Control and Communication in the Animal and the Machine. Cambridge, MA: The MIT Press.

Wittgenstein, Ludwig. (1980). Culture and Value. Translated by Peter Winch. Chicago: The University of Chicago Press.