Music and Technologies 2

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PREFACE

DARIUS KUČINSKAS

Music and Technologies 2 continues research discussions initiated in 2011 with an international conference held at Kaunas University of Technology, Lithuania. Selected papers from this conference were published in 2013 in the book with the same title – *Music and Technologies*. *Music and Technologies 2* is a collection of articles from the conferences held in 2012 and 2013. The main aim of this book is to continue discussions in the field of music technologies, to involve new themes and to extend ideas in the interdisciplinary music research developed at such important meetings as CIM (Conference on Interdisciplinary Musicology) and ISMIR (International Society for Music Information Retrieval). The book also explores some of the main contemporary ideas in the field of using music technologies in the compositional process, performance practice, music installations, and understanding the role and importance of these technologies in contemporary musical life.

The question of electroacoustics as a separate discipline is discussed in a text by the English researcher James Mooney. Understanding the connections between acoustic and visual media is presented in an article by the American musicologist Paulo C. Chagas. Italian musicologist Franco Fabbri presents an overview of the aesthetic and technological aspects of phonographic, not cinematic, stereo sound from 1958 to date, and the contradictions that happened to stereophonic sound. An Austrian researcher Gregor Widholm discusses some inquiries into technology in music acoustics and performance science. These questions are developed with practical experience presented in the texts of two contemporary composers: Simonetta Sargenti (Italy) and Neringa Žaltauskaitė (Lithuania). The cognition of music structures is analyzed by three researchers from Jävaskylä University. Finally, different aspects of applied technologies in classical music recording, including the distinction between music and noise recording, are explored in articles by the Lithuanian researchers Vytautas Kederys and Antanas Kučinskas.

We anticipate this book will be useful for those music researchers and practitioners who are involved in e-music composition, performance and analysis. Some parts of the book will be relevant for music educators and students. Others can serve as good examples of music analysis and research, applying new interdisciplinary methods and tools. The book is supported with a CD-ROM where audio and video files from the articles are included.

CHAPTER ONE

LES MUSIQUES ÉLECTROACOUSTIQUES: CONSTRUCTION OF A DISCIPLINE

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For the past three years, I have been studying the work of the English musicologist Hugh Davies. Davies was well-known as a performer, and builder of his own idiosyncratic electronic musical instruments, but in this chapter I will be focusing on his work as a researcher and documenter of electronic music during the 1960s. My hypothesis is that Davies redefined what electronic music *was* during that period, and, that his definition of electronic music still holds true today (at least as far as electronic music in an academic context is concerned). My argument, in essence, is that Hugh Davies constructed the discipline of what is now known as electroacoustic music.

Two questions are as follows. First of all, *how* did Davies go about constructing a discipline of electroacoustic music? To answer that question, I will examine Davies's published and unpublished research work from 1961–1968. Second, to what extent was he successful? Or, to put it another way, to what extent has Davies's definition of electronic music been accepted? To answer this second question, I will examine subsequent published literature and projects from 1968–2012 that have cited or been based on Davies's work, and show how the structure of Davies's model of electronic music is reflected in this subsequent work.

The strategies that Davies used were as follows. First, he mapped the existing territory of electronic music in a number of documents and publications between 1961 and 1964. Then, from 1966–1968, he adjusted and extended the map to meet his own specifications, providing, in effect, a new model—a new vision—of electronic music. Third, while he was

doing this he also made sure that he fought off any competition, so as to ensure that it would be *his* map—not someone else's—that would define electronic music in the future.

Davies started to map the territory, first of all, with a brief and sketchy "Survey of Electronic Music and *Musique Concrète*", written while he was still at school (Davies 1961*), then with a discography in which he started to catalogue electronic music on record and tape (started in 1962, published in 1964, supplement in 1966; Davies 1964, 1966), then by writing an extended historical overview for his undergraduate dissertation (Davies 1963*), and then—in an article entitled "New Directions in Music"—by providing a set of hypotheses on future developments (Davies 1963). In these studies, Davies identified a number of different *disciplines*, published *discourses*, and identified *countries* in which relevant activities were taking place. *Musique concrète*—the discipline of music with recorded every-day sounds—was practised in France and discussed in a book by Pierre Schaeffer (Schaeffer 1952); *Elektronische Musik*—music with electronically generated sounds—practised in Germany and documented by Eimert and Stockhausen (1955); and "computer music" in the United States (Illinois), described in a book by Lejaren Hiller and Leonard Isaacson (Hiller 1959).

In the early 1960s, much electronic music activity took place in isolated disciplinary, discursive, and geographic enclaves as just described. What Davies did that was original and innovative was to begin to write about these fragmented disciplines as if they were the constituent parts of single praxis; he began to place the various fragmented discourses into a single historical narrative of electronic music. This process had already started to some extent, as reflected in some of the literature from this period. Two other books mentioned in Davies's research are Prieberg's *Musica ex Machina* (1960) and Judd's *Electronic Music and Musique Concrète* (1961), both of which attempted some degree of generalisation rather than focusing on a single individual discipline. Davies was rather critical of the latter, but described the former as "the most useful book yet issued, [...] unfortunately not yet translated into English" (Davies 1964, 207). My suggestion is that Davies took this process of generalization further than any preceding author had, and in rather different directions.

Davies also began to identify activities in countries less usually associated with the genesis of electronic music, such as Poland and Japan. Davies thought that it was important for countries to retain their national

identities, musically speaking, because he felt that the international cross-fertilisation of distinct musical traditions was a potent force of musical innovation (Davies 1963). Because national identity was important for Davies, he tended to classify things by nationality, and we see that reflected in his writings (Davies 1961*, 1963, 1984*).

Having mapped the existing territory, Davies then began to adjust and extend the map to his own specifications, providing in effect a new model of electronic music. He did this by compiling and publishing what was his *magnum opus* of this period—a 330-page volume entitled *Répertoire International des Musiques Électroacoustiques / International Electronic Music Catalog*, started in 1966 and published in 1968 (Davies 1968). In the *Catalog*, Davies attempted to list every single piece of electronic music in existence, anywhere in the world. He also produced appendices in which he attempted to identify all uses of electronic music in Poetry, Jazz, Sculpture, Painting, and a number of other interdisciplinary areas. In other words, he expanded his initial map of electronic music by adding extra disciplines; by documenting the existence of electronic techniques in areas not traditionally associated with art-music composition. The *Catalog* is arranged alphabetically by country, representing a continuation of Davies's tendency to classify by nation, and also ensuring that all countries—including less well-known ones—were represented equally. Within each country, individual studios are listed, and under each studio there is a chronological list of the compositions realised there, including details of the composer, title of the work, the duration, the number of channels, and so on. The composers are all listed in an index at the back of the *Catalog*, so that it is possible to discover all of the works of a particular composer. The lists of electronic music works are classified according to their function: as seen in Table 1-1, the system of classification devised by Davies included works intended for concert performance, or as a sound-track for a theatre performance, or intended for radio broadcast, and a number of other categories. This was another way in which Davies sought to classify electronic music in a way that made it his own: by defining the various categories into which works of electronic music could fall.

When Davies compiled the *Catalog,* he sent a questionnaire to studio managers. In it, he did not ask completely open questions, but rather, he asked about particular things. For example, Davies specifically asked studio managers to provide information on electronic music that was connected with painting or sculpture. He did not ask, for instance, about

electronic music works involving dance. If he *had* asked studio managers about electronic music in dance, one wonders, how might the picture painted by the *Catalog* be different? Davies also asked studio managers to classify the electronic music works realised at their studios according to his own predetermined system of functional classifications (see Table 1-1). Studio managers were not allowed to invent their own classifications: they had to pick from one of the options that Davies had prescribed. If Davies had allowed studio managers to specify their own classifications, again, one wonders, how might the emerging picture have been different? The point I'm making here is that Davies, to some extent, shaped the answers he received according to the questions that he asked, and this is one of the ways he designed a model of electronic music to meet his own specifications.

Table 1-1. Functional classifications of "electronic music" used by Davies in the *Catalog*.

Standalone music	**Applied music**	
	Live	**Recorded**
C (tape)	O (opera)	F (film)
C+ (tape & insts.)	B (ballet)	R (radio)
C* (live electr.)	Th (theatre)	TV (television)
(c = concert)	MT (music theatre)	D (disc)
	Sn (sonorisation)	In (interval signal)
		St (study)

While compiling the *Catalog*, Davies made deliberate efforts to fight off the competition. For example, a musicologist based at a university in the United States—Dr Sven Hansell—had produced a document entitled "A Provisional List of Electronic Music Compositions" (Hansell 1966), dated February 1966—several months before Davies had even started work on his *Catalog*. Through quite a long series of letters and correspondence (Davies 1967*), Davies eventually made sure that Hansell would not publish his *Catalog* commercially; a step towards ensuring that his own project would not have any major competition.

Turning now to my second question: to what extent was Davies successful in defining electronic music? To what extent has the model of electronic music built by Davies in the 1960s been accepted? The *Catalog* was published in 1968, and since then, quite a substantial body of literature has cited it. What we find is that the structure of the *Catalog* is quite conspicuously reflected in that body of literature, as shown in Table 1-2. For example, there are a number of studies that focus on the electronic music of a particular nation or geographic area, reflecting the *Catalog*'s alphabetic organisation by country (Farra 2006; Kuluntausta 2008; Zajicek 1995). There are studies that focus on a particular studio, or on a particular composer (Garcia-Karman 2010; Giomi 1995), because those things are quite easy to look for in the *Catalog*. There are also a number of published articles that are based on one or another of the *Catalog*'s appendices; for example, an article on the history of electro-acoustic approaches to sound poetry (Wendt 1985). There are even some published articles that are based upon the "number of tracks" column in the main part of the *Catalog*. Simon Emmerson, for example, makes the observation that the first experiments in multi-channel sound—conducted at the GRM in Paris in the early 1950s—were carried out quite some time before multi-channel tape-music became common. In other words, multi-channel sound was "invented" (if you like) as a live performance activity, and it wasn't until later that it was used in the studio. The data that Emmerson uses to back up that argument are the data that appear in the "number of channels" column in the *Catalog,* which shows that almost all the works at the GRM studio were monophonic up to 1958, some seven years after the live performance experiments in multi-channel sound (Emmerson 2007, 150). Elsewhere, Manning (2006) makes use of the "tracks" column in a similar way.

There are also at least two quite prominent textbooks that use the data contained within the *Catalog* as the basis for making some quite general assertions about the nature of electronic music history. Manning, in *Electronic and Computer Music*, talks about an "exponential growth" in electronic music during the 1960s and uses statistics from the *Catalog* as the proof of that (Manning 2004, 401-02). Similarly, Thom Holmes, in *Electronic and Experimental Music*, notes that the number of electronic music studios worldwide increased dramatically between 1948 and 1966, again using statistics drawn from the *Catalog* to prove this (Holmes 2012, 154).

Table 1-2. Organisational features of the *Catalog* versus bodies of literature citing it.

Organisational features of the *Catalog*	**Bodies of literature citing it**
Organised alphabetically by country	Studies focusing on electronic music of a particular nation / geographic area
Organisation by individual studios	Studies focusing on the output of an individual studio
Composers indexed	Studies focusing on the work of an individual composer
Appendices mapping out different disciplines	Studies looking more closely at those disciplines
Works listed under a number of headings	Studies making use of the information under those headings

Landy, in an article on the musicology of electroacoustic music, even goes so far as to use the *Catalog* as a general pointer to the entire "history of [electroacoustic] music (and its pre-history)" (Landy 1999, 64), on which topic he footnotes the *Catalog*. Such examples illustrate the *Catalog*'s totemic status as a unique record of historical activities in electronic music, to the extent that the *Catalog* is sometimes even used as a symbolic representative of electronic music history itself.

The *Catalog* also continues to play an important role as an inventory. At the time it was compiled, Davies was at pains to point out that it was the first ever attempt to catalogue every piece of electronic music in existence, and that it would never be possible to attempt such a thing again (Davies 1968, v). And, he was right, because even today the *Catalog* is (as far as we know) the closest thing in existence to a complete inventory of electronic music compositions up to the end of 1966—or, at least, a complete list of the compositions that meet Davies's definition.

In the 1990s, the *Catalog* was used as the basis of a new project—*Internationale Dokumentation Elektroakustischer Musik* or 'EMDoku' for short (Hein 1999). That project used the *Catalog* to provide the data for compositions up to the end of 1966, and began the process of adding pieces composed after that date, using the format and system of classifications prescribed by Hugh Davies in the *Catalog*. (Actually, the classification system used in EMDoku is slightly adapted from Davies's, but remains very similar.) The EMDoku database has been identified by

the director of the Groupe de Recherches Musicales, Daniel Teruggi, as the closest thing in existence to a complete inventory of all electronic music (Teruggi 2004). This is another example of how Davies's work continues to define electroacoustic music in the present day.

In conclusion, what I have tried to show is that, during the early 1960s Hugh Davies set out to map the territory of electronic music, by writing about it historically as part of a grand tradition, by emphasising activity in different parts of the world, and by producing a discography and thereby starting to index it. Then, with the *Catalog*, he started to extend that map so that it more closely reflected his own particular view of what electronic music should be. In particular, he thought that electronic music should be interdisciplinary—including activities such as sculpture, poetry and painting as well as activities more traditionally associated with the electronic music studio. He thought it should be international; not in the sense of a single, homogeneous, global praxis, but rather, representing all nations as equals, and celebrating their distinct national identities. In turn, we see the structure of the *Catalog* reflected in subsequent literature that cites it, and in subsequent projects that build on its principles and systems of classification. In my view, this demonstrates that the *Catalog* occupies an important position in electroacoustic music history, and is therefore worthy of wider recognition and closer academic attention.

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CHAPTER TWO

AUDIOVISUAL AND MULTIMEDIA COMPOSITION: UNDERSTANDING THE CONNECTIONS BETWEEN ACOUSTIC AND VISUAL MEDIA

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The concept of audiovisual and multimedia art is shaped by the dominant role of film and television in our society. The technology of sound and image reproduction that became available in the second half of the 19th century was the foundation of audiovisual and multimedia creativity. However, we see emerging new forms of audiovisual art, which explore manifold connections between sound, music, image, body, movement, space, etc. This process becomes more and more differentiated with the popularization of digital technology and the predominant role of digital networks of mass distribution. This article investigates audiovisual and multimedia composition on the basis of the distinction between *medium* and *form*, which was proposed by Luhmann in the realm of the theory of art as a social system (Luhmann 2000).[1] I will examine these concepts, their historical context and their application to the understanding of the connections between visual and acoustic media. Finally, I will discuss the electronic music video as a genre and present an example of my own audiovisual composition, the work *The Journey* created in 1995 in collaboration with Inge Kamps.

"Medium" and "form" are not understood as structures, but as concepts accounting for operational distinctions made by an observer. "Medium" is defined as a loose coupling of elements, "form" as a tight coupling of elements (cf. Luhmann 2000, 104). The medium consists of elements or of events in the time dimension, but these elements are only loosely

connected. Form, by contrast, arises from the "concentration of relations of dependence between elements, i.e., thorough selection from the possibilities offered by a medium" (Luhmann 1990b, 216). The medium is defined by the nature of the loose elements of which it consists, but the medium is only perceived through the form that coordinates its elements. As Luhmann explains: "We do not see the cause of light, the sun, we see things in the light. We do not read letters but with the help of the alphabet, words" (Luhmann 1990b, 216).

The distinction between medium and form can also be understood as a distinction between *chaos* (*entropy*) and *order* (*negentropy*), as used in information theory (Shannon) and cybernetics (Wiener). In *The Human Use of Human Beings*, Wiener expounds a vision of cybernetics as a science that contends against the natural tendency of the universe to deteriorate and lose its distinctiveness, to move "from a state of organization and differentiation in which distinction and forms exist, to a state of chaos and sameness" (Wiener 1954, 12). Cybernetics uses probabilistic and statistical methods to calculate and predict how information comes into being from an indeterminate, chaotic state. When information emerges from chaos, it becomes a fundamental attribute of communication. From mathematics and statistics, cybernetics moves towards a theory of knowledge extending the probabilistic view of the world to the social sphere. In the age of information, the cybernetic study of communication requires an understanding of the mechanisms of control underlying the exchange of information between man and machine and between machines themselves. Although the universe tends to run down, Wiener believes that "there are local enclaves whose direction seems opposed to that of the universe at large in which there is a limited and temporary tendency for organization to increase" (Wiener 1954, 12); and organizing life in these enclaves is the task of the new science of cybernetics.

The idea of a chaotic universe underlying life is expressed also by the distinction between *randomness* (*noise*) and *pattern*. Wiener suggests the metaphor of the organism as being a message through which the organism emerges from a background of randomness to constitute itself as a pattern of organization:

> Organism is opposed to chaos, to disintegration, to death, as message is to noise. To describe an organism, we do not try to specify each molecule in it, and catalogue it bit by bit, but rather to answer certain questions about it which reveal its pattern; a pattern which is more significant and less

> probable as the organism becomes, so to speak, more fully an organism. (Wiener 1954, 95)

By focusing on the body, recent humanistic studies have reversed the tendency of cybernetic and computational thinking to treat information as an abstract concept, disconnected from a physical structure. Nowadays, body metaphors frame the discourse on information. In *How We Became Posthuman*, Katherine Hayles reconstructs the distinction between randomness and pattern in the so-called "posthuman" society. In opposition to the computational account of information as a non-material entity, Hayles' vision of the posthuman emphasizes the role of embodiment and materiality in the processes of constituting meaning: information includes both the technical meaning of information and the perception that information is a code carried by embodied entities. Hayles proposes a representation of meaning in the form of a semiotic square with two axes: the main axis is the distinction between *presence* and *absence*; the secondary axis is the distinction between *randomness* and *pattern*. Two diagonals that connect these two axes trigger a dynamics of signification. The diagonal connecting presence and pattern conveys *replication*; the diagonal connecting absence and randomness signals *disruption*. The interplay between presence and absence shapes materiality; the interplay between randomness and pattern gives rise to information (cf. Hayles 1999, 247-251; see Figure 2-1).

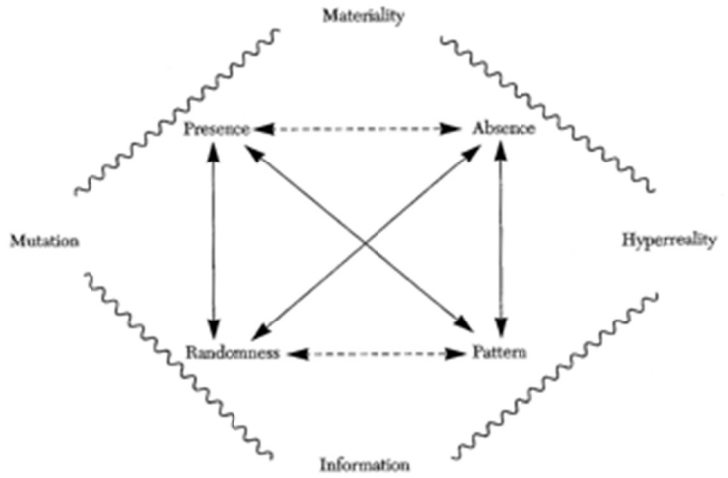

Fig. 2-1: The interplay between randomness and pattern (Hayles 1999, 249).

Hayles envisions the posthuman as a more sophisticated way to approach the world of new technologies in which the human is seen not as an autonomous self but as part of a chaotic and unpredictable world. Instead of assuming an attitude of panic—as cybernetics does by assigning to itself the task of reversing the natural process of entropy—Hayles suggests that we have to accept the "posthuman"; it means that we should abdicate from taking control of the world and try to "maximize human potential in a world that is in essence chaotic and unpredictable" (Hayles 1999, 291).

What is the use of the distinction between medium and form for analyzing artistic forms? As Luhmann points out, art depends on primary media such as acoustics and optics. Sound objects and events are shaped in the acoustic medium; visual objects and events are shaped in the optical medium (Luhmann 1990b, 218). Furthermore, art also needs a higher medium in order to communicate. The most general medium of art is the so-called medium of "meaning" [*Sinn*].[2] Meaning is processed through the distinction between actuality and potentiality. The form thus selectively reduces the combinatory possibilities of the medium. The actualization results from selective processing that restrains and limits the connecting possibilities. For example, any sound can be combined with any other in a temporal flow, but in a piece of music there must be some constraints in selecting which sound follows the previous one. Each new sound actualizes the potential of musical work. The result is that the distinction that creates meaning is itself a form that allows subsequent distinctions in time; i.e., "meaning is a form that creates forms in order to assume forms" (Luhmann 2000, 108). In short: the form updates and renews the medium by coupling and uncoupling it. The form processes a selection of distinctions that actualizes its potential.

This recursive character of the distinction between medium and form is what allows the reproduction of meaning. Every distinction between medium and form creates "a form with two sides, one of which—the side of the form—contains itself" (Luhmann 2000, 104). In other words: "meaning is also a form that on both sides contains a copy of itself in itself" (Luhmann 1998, 50). Each new operation that creates meaning is a re-entry of the distinction medium and form in one of its sides.[3] The successive operations through which a medium is transformed into a form, then into a medium, then into a form, and so on, generate a recursive network of distinctions, a feedback-loop mechanism that ultimately drives

and controls the system itself. This leads thus to an evolutionary conception of meaning, which applies also to art.

The distinction between medium and form is based on the view that society is a self-referential and closed system, an "autopoeitic" system that produces and reproduces communication. Art is a sub-system of society sharing the same characteristics of the society in terms of autonomy and operational closure. Art communicates through works of art, which can be considered as "compact communication or as a program from innumerable communications about the work of art" (Luhmann 1990c, 194). Art can only function as communication for those who can distinguish the difference between medium and form and communicate about it. Art articulates the difference between medium and form by making available new possibilities of form building. For example, medieval music created the medium of modality for distinguishing melodic forms, the medium of polyphony for harmonic forms. Furthermore, music created the medium of tonality, the medium of atonality, the medium of electroacoustics, and so on.

Luhmann argues that artistic evolution can be described "as the increase in the capacity for dissolution and recombination, as the development of ever new media-for-forms" (Luhmann 1990b, 221). Modern art has appropriated media such as the human body, society, technology, and even art itself—for example, the works of art that are staged as paradox (Duchamp and Cage). An artwork comes into being through an operation that transforms an unmarked space into a marked space and creates a boundary by crossing that boundary. The determination of one side makes also the other side accessible. The work of art cannot reject the world; it invites us to discover further distinctions that can be made by observing the work of art itself and what is left outside. The work of art thus stimulates the crossing of its own boundaries. This double function of art is what permits us, for example, to keep performing and listening to the music of the past. Any new interpretation of the music by Bach, Mozart, Beethoven, etc. allows us to gain new insights into both the marked and the unmarked space of these works. The aesthetic experience accomplishes the paradox of making visible what is invisible. The music of the past becomes itself a medium for new distinctions of forms.

The focus on "medium"—and on related concepts such as "mediality", "medialization", "medial thinking", etc.—dominates studies on digital art and music, particularly in the German-speaking countries. There is a

tendency to interpret sound as a "media object" and to categorize aesthetic issues according to the media structures and channels. This is evident, for instance, when emerging genres such as "sound art", "radio art", and "soundscape" are elucidated as media-specific forms; or when one claims that the far-reaching "medialization of sound" impacts the "compositional forms, structures and aesthetics concepts until it finally questions our traditional understanding of music" (Harenberg 2012, 7-8).[4] Media studies and communication studies offer very different theories on the history and the structures of media. But overall they deliver a vision of media shaped by the reality of the mass media and media technologies. The difficulty of such a consideration appears when one asks whether there is a special medium for that which we today call audiovisual art. The main reference is of course the film, in which the image is at the forefront and the music plays mostly a secondary role. The relation between image and sound in film is thus an asymmetric one.[5] The cinema is the symbol for the dominance of technical images in our society, but we see emerging other audiovisual forms with a more differentiated relationship between sound and image: from experimental film to video, from musical composition to sound installation, from concert to multimedia performance (not forgetting the video game, which has evolved into a powerful medium using new technologies and unfolding an unpredictable, ambiguous potential of creativity).[6] Media studies focused on information tend to assign a privileged role to digital technology in the constitution of the "audiovisual" and the "multimedia". Digital technology is considered a new form that brings about the convergence of channels and the integration of formats through multimodal coding. From this point of view, multimedia is defined as "a multimodal aggregation of digital media" (Hartmann 2008, 8). Friedrich Kittler, who remains maybe the most influential German media theorist, shapes the discourse on digital technology with a radical pessimistic tone:

> Before the end, something is coming to an end. The general digitization of channels and information erases the differences among individual media. Sound and image, voice and text are reduced to surface effects, known to consumers as interface. Sense and the senses turn into eyewash. Their media-produced glamour will survive for an interim as a by-product of strategic programs. Inside the computers themselves everything becomes a number: quantity without image, sound, or voice. And once optical fiber networks turn formerly distinct data flows into a standardized series of digitized numbers, any medium can be translated into any other. With numbers, everything goes. Modulation, transformation, synchronization; delay, storage, transposition; scrambling, scanning, mapping a total media link on a digital base will erase the very concept of medium. Instead of

> wiring people and technologies, absolute knowledge will run as an endless loop. (Kittler 1999, 1)

From the perspective of critical and phenomenological studies of digital media, "sound" and "vision" are crucial references. The reproduction technology introduced in the 19th century created new possibilities for the arrangement of medium/form relationships associated with the primary media of "acoustics" and "optics". They reconstructed our experiences of "hearing" and "seeing". Digital technology represents a further step in the transformation of the audio and visual experience. Recent accounts of digital technology focus on models of embodied and extended cognition in the construction of meaning, affecting also our understanding of sound and vision. In *The Auditory Past*, Sterne argues that the "boundary between sound and not-sound is based on the understood possibilities of the faculty of hearing" which is grounded in our bodily practices (Sterne 2003, 12). The practices of sound reproduction, as Sterne claims, have to be understood in relation to other bodily practices. In *Philosophy for New Media*, Hansen analyzes how digital visual media engage the body in the process of creating meaning. With digital media, the body has the function of filtering information and providing an affective supplement. Hansen sees a "fundamental shift in aesthetic experience from a model dominated by the perception of a self-sufficient object to one focused on the intensities of embodied affectivity" (Hansen 2004, 12-13).

These preliminary considerations should have made clear that the audiovisual and multimedia represent a complex field of investigation. It is necessary to develop a comprehensive account of the relation between "sound" and "image" beyond the conventional forms of the film in order to bring up the connections between music, sound and visual art. It is also necessary to critically review the discourses on digital media, pointing out the broad spectrum of possibilities of audiovisual and multimedia composition, in terms of both convergence and differentiation of media and forms.

The Electronic Music Video as Audiovisual Genre: *The Journey*

The popularization of digital technology has accelerated the convergence of sound and image in artistic creation. Audio and video recording, editing, and processing can be accomplished with the computer using similar techniques, sometimes integrated in the same virtual

environment. Both the digital audio workstation (DAW) and the digital video workstation, for instance, support this integrative approach by providing the artist with a set of hardware and software devices, tools, and plug-ins. Moreover, the technology available to individuals can practically match the quality standards of today's professional audio and video production.

Let's examine the music video clip as a new genre of popular audiovisual composition. The music video clip emerged as a filmed version of a song performance and became a mass consumption product in the 1980s thanks to MTV. From the media of film and television, the music video clip has migrated to the internet, whereby its aesthetics have evolved from being a provider of visual illustration for a song into a medium for shaping and sharing individual and collective behaviors, attitudes, identities and political views. Launched in 2005, the website YouTube has taken the "aura" out of the production of the music video clip, converting it into a global art object. Anyone can make a music video clip, upload it onto the internet, and eventually be discovered or acknowledged as an artist. YouTube is the medium that accomplishes the worldwide banalization of the music video clip; it redraws the boundaries between the system of art and the system of mass communication while unfolding a new kind of creativity, which conveys the ambivalence of information and communication technologies. (Global networking creates new forms of freedom but also sets new boundaries for freedom. It opens up new possibilities for individual and collective exchange and at the same time develops new strategies for monitoring and controlling these exchanges, such as the mechanisms that are embedded in certain websites, such as Google). The music video clip is the emblematic archetype of a form that emerges from the convergence of film and music and transforms itself into a medium for shaping new audiovisual forms in the digital society.

Let's now turn our attention to the music video that arose out of the tradition of "serious" electronic music. The intermedia form, coupling electronic sounds with image projection, enjoys growing interest and is developing into a sub-genre of electroacoustic music. The music can be "heard" and "seen" at the same time. The audiovisual merge seems to have the potential to make the music more accessible to a broader audience. But here, one has to raise the following question: Does the multimedia intensify the sensory experience and make it thus more attractive, or does it simply provide a distraction that reinforces the patterns of entertainment

and diversion in everyday life? Whatever the answer may be, embedding the music into an audiovisual form provides the listener with an immersive experience that is functionally linked to the situation of the movie theater: the music is projected into the room through loudspeakers, the sound surrounds the bodies, while the image projected onto a screen—usually located in front of the audience—focuses the audience's attention on an illuminated surface. The electroacoustic music video relating sound, image, and space is primarily an immersive experience that can be also integrated with other forms, such as the concert with live music performance (vocal, instrumental, and/or electroacoustic music); the performance with dance and acting; the installation; and so on. Traditionally, the audiovisual art is structurally coupled with the space both as physical and social medium. The immersive experience relates physical presence to social presence. By contrast, watching an electroacoustic music video on a computer, on the internet, or on a mobile device is mainly an individual experience, in which the embodied experience is dispersed along a spectrum of possibilities emerging from the interaction with the technological environment.

In the following, to illustrate the genre "electronic music video", I will introduce an example of my own work, *The Journey*, a collaboration with the German visual artist Inge Kamps. I became acquainted with Inge Kamps in 1995 when we both participated in the "Babel" group, a project by artists from Cologne for developing collaborative work. Hans-Ulrich Humpert, composer and director of the electronic studio at the Musikhochschule in Cologne (he was my teacher), had invited me there, and he likewise collaborated with Inge Kamps at a later date. The electronic music video *The Journey* was created in 1995 as the first result of my collaboration with Inge Kamps and premiered in the event "Best of Babel" at the Musikhochschule in Cologne. Two other music videos followed—*Einblick* (1995) and *Zeit-Wände II* (1997)—as well as the music video installation *Zeit-Wände VII* (2003).

The electronic music of *The Journey* (length: 9:16) was composed for a multimedia work *Global Village—Hidden Pathways*, performed in 1993 in Bonn, Germany. It was developed in collaboration with the BEC (Bonn Research Center of Computer Media) and the American visual artist Doris Villa. The electronic music was integrated into an interactive holographic environment and the live performance of a singer. For *The Journey*, Inge Kamps created a new videography in 1995 on the base of the electronic music, trying to creating a synchronism between sound and image. The

visual composition uses as source material footage of four motifs—water, earth, oscillograph, and mind-machine—as abstract textures and patterns in synchrony with the music. The aesthetics of *The Journey* emphasizes the correlation of auditory and visual perception: the two layers of experience are meant to stand over against each other as equals and at the same time create a close structural connection, by which an intermedial unity results. With the synchronism of auditory and visual perception, the electronic music video pursues the concept of a time-space synesthesia. From my point of view, *The Journey* is a very successful example of the exploration of synesthetic perception in audiovisual art (http://soundofcities.commagazine/moviesby/thejourney.html).

The composition received an award from the Internationaler Videokunstpreis SWF/ZKM in 1997.

Notes

[1] The medium/form distinction reproduces the system/environment distinction that serves as the basis for Luhmann's theory of social systems (cf. Luhmann 1984). Luhmann revised and reformulated his theory again and again. A further discussion of the medium/form distinction can be found in Luhmann's later *Die Gesellschaft der Gesellschaft* (1997, 190–202). The many essays that Luhmann dedicated to art and literature over the space of more than 20 years reflect also the continual development of his theory (cf. Luhmann 2008). For English translations cf. Luhmann 1995 (translation of Luhmann 1984); 1990a (a collection of essays); and 2013 (a series of lectures).

[2] "Meaning is the medium that allows the selective production of all social and psychic forms. [...] In relation to Edmund Husserl's phenomenology, meaning is for Luhmann the premise of every processing of experience: meaning points in the surplus of references to further possibilities of experience in each individual experience". (cf. Baraldi, Corsi, and Esposito 1997, 170).

[3] George Spencer Brown introduced this idea of form as distinction in his book *Laws of Form*, which is a constant reference in Luhmann's theory. For the concept of "re-entry", see Spencer Brown (1969, 56).

[4] For an account of media from a German perspective see: Kittler (1999), Hartmann (2000), and Kloock and Spahr (1997).

[5] Michel Chion's book *Audio-Vision* (Chion 1994) offers a comprehensive account focused on cinema of the relations between sound and image.

[6] Manovich proposes a theory of new media based on the differences between new and old media. He claims that cinema was the first media to make use of the principles that shape new digital media (cf. Manovich 2000, 49-51).

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