


ART AND TECHNOLOGY IN POLAND



**FROM CYBERCOMMUNISM
TO THE CULTURE OF MAKERS**

ART AND TECHNOLOGY IN POLAND

ADAM MICKIEWICZ UNIVERSITY IN POZNAŃ

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ART AND TECHNOLOGY IN POLAND

FROM CYBERCOMMUNISM TO THE CULTURE OF MAKERS

edited by

Agnieszka Jelewska



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This book is a collection of texts dedicated to the changes taking place in many areas of Polish art of the past few decades under the impact of technological tools. It also demonstrates many authors' interests in new scientific research. These transformations are taking place very fast and are present in all forms of art, such as in literature, music and the visual, performance arts. The texts, then, are a record of the scientific and artistic experience of their authors who are involved in the dissemination of a new comprehension of the relations between culture, science and technology and of those who see the need for bridging the gaps in scholarship on contemporary art.

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Introduction

Relations between art, science and technology in Poland have their long and complicated tradition that goes back to the experiments of the first avant-garde and the rejuvenation of local art after World War II. During the years of the political “thaw,” when the climate around the activities taking place at the intersection of art, design and technology was more favourable, new creative initiatives and practices sprung up which have, to date, inspired many artists and scientists. Suffice it to mention here the works of the Experimental Studio of the Polish Radio, the art practices arising from seminars by Mieczysław Porębski and later ones, works of the Film Form Studio, as well as actually independent work by such outstanding Polish artists as Krzysztof Wodiczko, Zbigniew Rybczyński and Grzegorz Kowalski (during the first stage of his artistic career). After the “thaw,” and due to the political situation, a crisis in this thinking ensued; many artists left Poland and many others entirely changed their approach to such experiments. In fact, it was only in the 1990s that the above practices were resumed. Because of the long absence of contacts with Western technological and scientific developments of the latter half of the 20th century, Poles had to quickly make up for time lost and had to learn how to apply new tools. First and foremost, however, they had to understand their specificity and impact on new definitions of the human being and their environment. Plugging into the global network of data exchange, Poles simultaneously plugged into a new model of knowledge management. The 1990s in the global system is no doubt the era of an IT revolution. The Internet, acquiring ever new users, not only led to the remediation of many traditional information carriers but also, and more importantly, brought about new strategies of knowledge distribution. Once treated as utopian, the ideas of exchanging experience and knowledge espoused by the first hackers of the 1960s became a fact. As of that moment we have observed how the Internet has rejuvenated virtual communities focused around common interests, beliefs and questions. Hence there has been a return to the idea of creating independent culture venues which are in fact technological workshops, studios and laboratories where people can meet and exchange practical competences. Therefore, Poland's entry into the global system of information exchange not only meant fast technological progress but also introduced new forms of participation in culture and society. Moreover, it revitalised the definitions of a technology user, locating him or her between two opposing zones of the consumer and conscious and creative artist. Interestingly, by taking

up Western technological culture, not only did we get used to devices increasing the comfort level in our lives, but we also took over ideas inherent in this culture. By making use of specific appliances and operational systems, we agree to participate in models of culture which were embedded even at the level of design. It is those models that in a large measure define contemporary cultural and social practice. It is precisely here that a huge area for new forms of art which are critical of reality opens up; this reality cannot and must not be stripped of technology.

The WRO Art Center appeared in Poland in the late 1980s and early 1990s. Its authors, first in the form of a festival and then as an institution, made pioneering efforts to extend the spectrum of impact of media and technological art in Poland. The economic growth of the 1990s paralleled the fact of adopting new scientific and artistic practices. Polish artists and scholars began to participate in international conferences, festivals and projects which combined art, science and technology. More and more institutions today enter the critical discourse about techno-culture, which confirms that not only have we successfully made up for the time lost, but that we also need this kind of reflection.

This book is a collection of texts dedicated to the changes taking place in many areas of Polish art of the past few decades under the impact of technological tools. It also demonstrates many authors' interests in new scientific research. These transformations take place very fast and are present in all forms of art, such as in literature, music and the visual arts. Importantly, however, and this follows from the studies that were carried out when we were preparing these texts for publication, new artistic practices emerge which to a great extent transcend classical definitions of art and its disciplines. These are often activities taking place at the intersection of artistic and scholarly competences which pose major problems that today's human beings, faced with technological and cultural processes, have to deal with. In most cases the texts published in this book are penned by theoreticians and practitioners, i.e. those culture scholars whose own practice within the different domains of culture is the foundation of scholarship. Another group are artist-scholars who deliberately apply scientific theories not only to inspire, but also to inform about their projects. The texts, then, are a record of the scientific and artistic experience of their authors, who are involved in the dissemination of a new comprehension of the relations between culture, science and technology, and of those who see the need for bridging the gaps in scholarship on contemporary art. Most texts of this kind in Polish discourse still assume a separate position of art vis-à-vis that of science and technology. They are mainly focused on the analysis of aesthetic, formal, historical, cultural and social factors, without entangling artistic practice into the network of relations of translation and mediation (according to Bruno Latour) between strict scientific and laboratory knowledge and social expectations, needs and fears. Still, new important work has sprung up in recent years in the global discourse on *art&science* (e.g. Stephen Wilson, Eduardo Kac, Jill Scott); this work has launched, developed and recomposed research on a more profound analysis of the relations between the newest art and laboratory experiments and technological advancements. Such publications trigger a crucial reconfiguration of the manner of think-

ing about art, science, technology and the tension arising between these and social expectations.

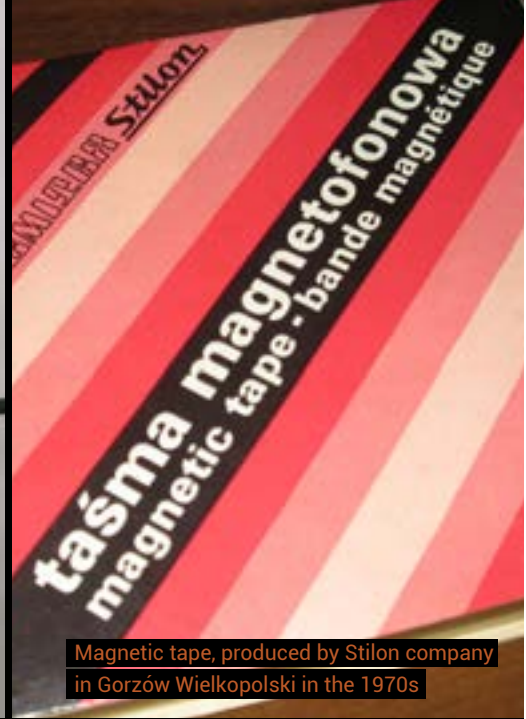
New artistic practice is at the same time one of the consequences of the post-technological turn. Huge progress has been made in this respect over the past 60 years. We have moved away from the definition of a technological society (e.g. in Jacques Ellul's dystopian and portentous approach from the 1950s in his book *The Technological Society*), in which technology was regarded mainly as devices extraneous to culture. Today, technological systems have become a subject of post-technological studies, where they are treated and analysed as an inherent part of social, political and economic processes. This means that technology moved from the position of an external agent to the role of a multipurpose module integrated with major cognitive, evolutionary and cultural processes; this module is additionally meant to generate new supra-local updates and improvements. In other words, we have moved from the definition of technology as a set of devices with a concrete, palpable dimension to technologies which are invisible, as they are tele-information, bio-information or bio-genetic systems. Entering the post-technological social and cultural domain, Polish science and art must re-visit a dialogue on the possible interactions and consequences of actions. The synergy of the multiple aspects of science, such as informatics, biology and physics and their hybridisation, as stressed by many scholars (the three basic revolutions are addressed, e.g. by Michio Kaku), calls also for the incorporation into a new situation of all kinds of mediation activities meeting new social expectations. Due to the highly dynamic nature of the techno-cultural transformations, the set of texts in this book acknowledges and indicates the current creative practices which redefine the very notion of science and point to the need for a profound reflection in many areas of contemporary activities. The texts clearly indicate the fields of artistic and cultural practice where changes and a deliberate approach to new creative tools are the most conspicuous (media art, design, creative coding, video games, music, literature), and where, due to many social and cultural factors, changes are hampered and halting (theatre, painting). Perhaps the new reality, along with its technological instruments, requires forms different than the traditional ones, rather than ordinary attempts at restructuring, which always leave the same old content in the centre and only wrap it up in a new aesthetics. Contemporary creative practices must, moreover, critically analyse their own artistic processes and the networks of their distribution; in this case the tools and competences of their authors are not exclusively a matter of technique but a part of meta-media interactions, translations and social mediation. New forms of participation, expression and comprehension of the techno-cultural reality emerge.



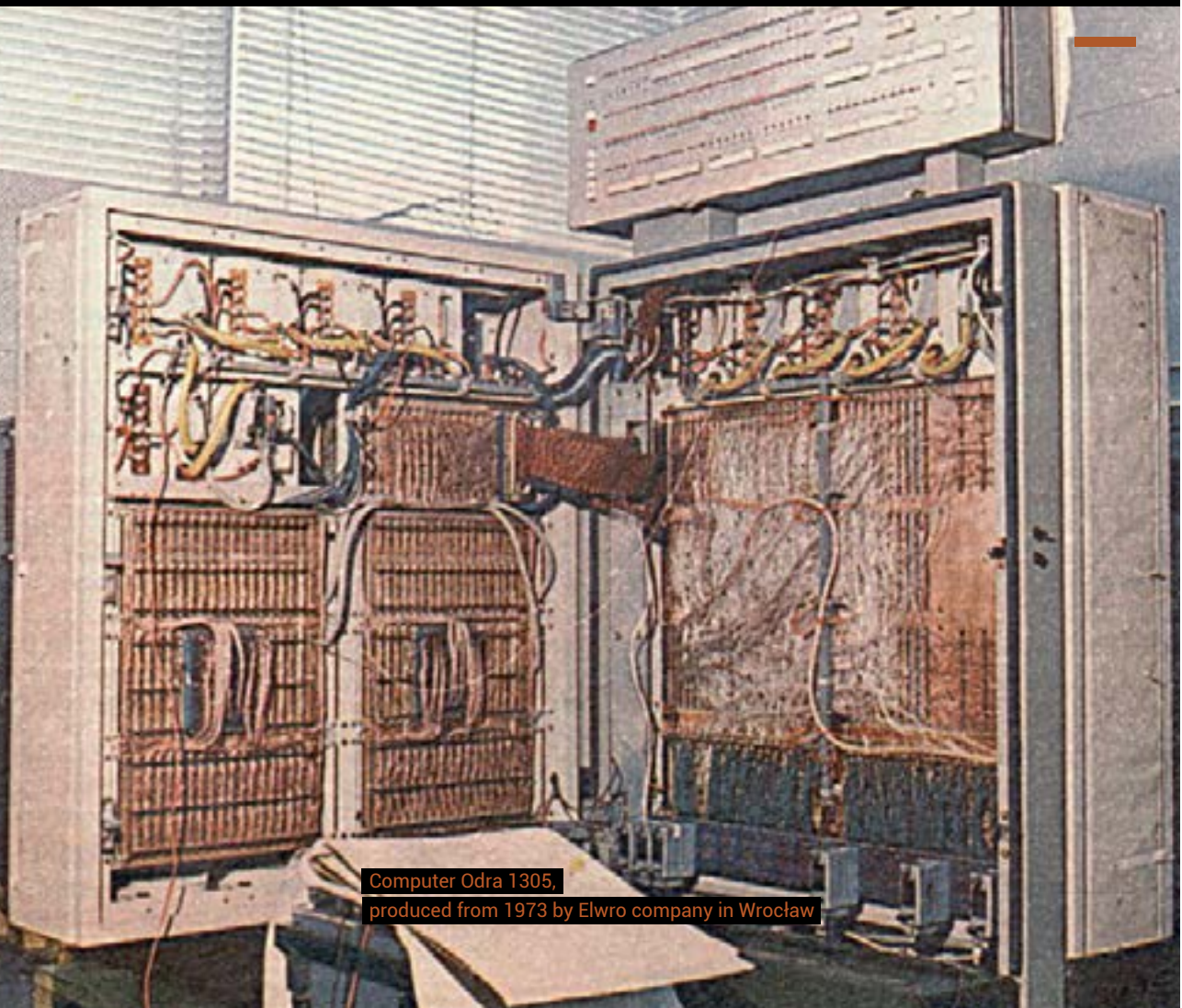
Video wall, WRO Festival, Wrocław, 1989



Cassette player UNITRA model MK 232,
produced in the 1980s under licence by GRUNDIG



Magnetic tape, produced by Stilon company
in Gorzów Wielkopolski in the 1970s



Computer Odra 1305,
produced from 1973 by Elwro company in Wrocław

FROM CYBERCOMMUNISM TO DIGITAL TURN

Agnieszka Jelewska, Michał Krawczak

The difficult relations between art, science and technology in Poland

Piotr Krajewski

The WRO Festival and the beginnings of the digital breakthrough in Poland



The difficult relations between art, science and technology in Poland

Contemporary science and technology have common horizons... there exists a world that belongs as much to the artist as to the scientist/researcher or practitioner/technician.¹

When writing the above words for the catalogue of the First Exhibition of Modern Art in 1948/1949, Mieczysław Porębski considered the possible relations of Polish art, science and technology which had been resurrected after the wartime atrocities and the involvement of science in military objectives. Back then it seemed that this line of development in art would be a chance for new experiments, despite the well-known limitations and censorship on the part of the regime. According to Porębski, this was also to be a proposal of continuing and revisiting the accomplishments of the first avant-garde in its many and varied currents, such as Constructivism, Futurism, innovative actions in music, literature, film, photography, etc. However, the history of the concept based on building bridges between art, science and technology in post-war Poland proved more complex, which no doubt impacted the unique approach of the artists to this type of experiments and to the overall social aura around these questions. A confluence of political, economic and social factors generated a zone of affective experience with respect to techno-culture, and this experience is still powerful in many intellectual circles. In addition, this mix of factors influenced a clear division of the humanities from the exact sciences, and of art education from science.

The paradigm of art and science still remains a rather enigmatic motto, practised responsibly by few Polish artists. This situation changed with the digital native generation's proposals for new creative practices in the early 21st century. The complicated relations between art, science and technology in Poland continue to reflect the dystopian narratives generated mainly by the experience of both world wars, the cold-war arms race, martial law as well as ecological disasters, including nuclear arms tests on both sides of the conflict. Technology is treated as a new version of social abjection, something we would like to exclude from our experience at all costs while we are aware that this zone

¹ Mieczysław Porębski, "Wstęp do Katalogu I Wystawy Sztuki Nowoczesnej," in *I Wystawa Sztuki Nowoczesnej pięćdziesiąt lat później*, ed. by M. Świca, J. Chrobak, Kraków 1998, quoted after: *Cosmos calling. Art and Science in the Long Sixties*, ed. by J. Kordjak-Piotrowska, S. Welbel, Warszawa 2014, p. 66.

increasingly hybridises the human subject. Many people, especially from the generation of the 1960s and 1970s, associate technology first and foremost with the Chernobyl disaster – the first invisible yet global and lethal threat.

We all remember the sunny April day when the regime coyly announced radioactive pollution only to encourage people to take part in the May Day parades as if nothing had ever happened. We also remember the iodine solution, called Lugola fluid, which had to be drunk as a remedy to fight off the airborne carcinogenic elements. While each of us knew perfectly well the pictures taken in Hiroshima and Nagasaki, the direct experience of an “invisible” technology that is destructive to human life and transforms our atmosphere proved symptomatic for defining the human–technology relation in Poland. At the same time, we cannot forget the difficulties associated with access to new technological achievements and the fact that science in the Eastern Bloc was mainly controlled and managed top-down, serving particular directives and plans. This situation no doubt hampered the development of the art-science relations similar to those in the West, where after all what was crucial was not the use of new devices and designing and programming tools, but also a critical approach to them, as proposed by authors in many of their works. Under communism it was impossible to apply a subversive and hacktivist approach to technological advancements and, therefore, only after the watershed year of 1989 have we been able to speak about the creation of new artistic practices at the intersection of art, science and technology, which, however, have their single offshoots that hark back to an earlier time.

Cybercommunism

One of the major research practices and a yardstick for thinking about the relations between science, people, technology and art in the second half of the 20th century is the history of the development and definition of cybernetics, a science which significantly contributed to the change of ontological paradigms of modernity. As a new meta-science, it developed as early as in the 1940s as part of The Macy Conferences.² This knowledge

² *The Macy Conferences* was a series of interdisciplinary meetings organised between the years 1946–1953 in New York by the neuropsychologist and cyberneticist Warren McCulloch and the Josiah Macy, Jr. Foundation. The conferences aimed at establishing the fundamental principles for science dealing with the human brain. At stake was the creation of a universal discourse which would be clear to scholars of different scientific areas. The so-called core of the conference group was made up of eminent specialists from a variety of disciplines, e.g.: William Ross Ashby (psychiatrist, cyberneticist), Gregory Bateson (anthropologist, cyberneticist), Julian Bigelow (pioneer in computer engineering), Heinz von Foerster (bio-physician, philosopher, cyberneticist), Ralph W. Gerard (neuropsychologist, behaviourist), Kurt Lewin (social psychologist), Warren McCulloch (psychiatrist, neuropsychologist, cyberneticist), Margaret Mead (anthropologist), John von Neumann (mathematician), Walter Pitts (logician), Arturo Rosenblueth (physicist, cyberneticist) and Norbert Wiener (mathematician, cyberneticist).

encapsulated the practice and theory of many sciences and generated, redefined and ushered in many cognitive models of contemporary research.³ Its development proceeded differently on either side of the cold war conflict and demonstrated differences in the approach to social relations with science and emergent technologies. Ever since inception, it was a major impetus for creating interdisciplinary teams of researchers, practitioners, technicians and artists, and was also to become a meta-language defining both technological and scientific problems and the life of the modern person within the social and cultural communications systems. The very title of a 1948 book by one of the founding fathers of the current trend: *Cybernetics, or Control and Communication in the Animal and the Machine*, clearly demonstrated that the new science opened up possibilities of experiments between disciplines and concepts which had previously been pursued separately. Norbert Wiener, the author and participant of The Macy Conferences, believed that once we define behaviour as change with respect to the environment, it is characteristic of, and can be studied in relation to, machines and animals alike. Elements such as control, self-regulation and feedback taking place in all settings, both technological and biological, proved to be of the utmost importance. Convincing reflections on the parallels between human beings and machines, as James Gleick observes, contributed to the enormous success of the book in the US and in Western Europe.

He was interested not only in the explanation of the progress of informatics, which in fact was tangentially related to his interests, but in how informatics or data processing can enlighten humanity. As it turned out, he was seriously involved in questions of mental illnesses, mechanical prostheses and social aberrations. He feared it may devalue the human brain, much as factory machines devalued the work of human hands.⁴

The unique set of Wiener's scientific interests – he began his career from research on anti-aircraft artillery, then mainly on white noise and interference, statistical methods leading to determining events on the basis of distorted data⁵ – later on laid the foundation for cybernetics as a practice of systemic management in various human and machine settings and for his profoundly humanistic and pro-social approach. He also offered an entirely new aspect of scientific work as an interdisciplinary cognitive and ethical practice. At first his theory was enthusiastically received, yet later on it was more and more often rejected and criticised in the USA. Wiener discovered specific ways of programming and projecting situations of data transfer, and saw in these possibilities for human develop-

Regular participants included, moreover, Claude Shannon (engineer, mathematician, author of information theory), Erik Erikson (developmental psychologist, psychoanalyst) and Talcott Parsons (sociologist).

³ The UK was another major centre, and the earlier studies by Allan Turing.

⁴ James Gleick, *Informacja. Bit, wszechświat, rewolucja*, transl. by G. Siwek, Kraków 2012, p. 224.

⁵ Wiener was a co-author of a major text titled *Extrapolation, Interpolation and Smoothing of Stationary Time Series*, in which he discussed the "statistical method of predicting future events on the basis of interrupted, uncertain and tainted ('damaged') data from the past. This was a very ambitious concept for that time and the state of development of anti-aircraft artillery." Gleick, op. cit., p. 221.

ment via a rediscovery of communications systems around around humans, and via a strengthening of the human body and mind.

In the epoch of corporate monopolies and atomic weaponry, the theory that explained the behaviour of both humans and machines must be used to place humans in control of their machines. Abandoning his earlier enthusiasm for Turing's prophecy of artificial intelligence, Wiener now emphasised out the dangers posed by sentient computers.⁶

It was precisely for this reason that he would oppose the creation and development of artificial intelligence, which in the 1950s was a priority for US science; he was also opposed to the arms race. Aware of the risk of an unbridled growth of machines and of designing their work to replace human work, in the introduction to the Polish edition of *Cybernetics* he wrote as follows:

The present-day industrial revolution wishes to devalue human brains, at least in the area of making simpler, more stereotypical decisions ... If another revolution takes place, a run-of-the-mill person with average or less than average abilities will have nothing to sell ... We have contributed to the birth of a new science which ... covers technological achievements of unprecedented capacities for good and evil. We may only convey them to the world around us, but this is a world of Bergen-Belsen and Hiroshima. We do not even have a choice. They belong to our era; if we did not talk about them, we would at best relegate the development of the entire science to the least responsible and most corrupt of our engineers.⁷

His increasingly "leftist" and somewhat dystopian ideas began to arouse suspicions and alienated, for example, the followers of McCarthyism, who saw him as a threat to the stable progress of America's science policy. No wonder his vision of cybernetics, non-committed to servicing the army and opening up a debate on the moral accountability of scientists and politicians to the future of human beings in a technologically transformed reality, made a growing number of sponsors give up their financial backing for research centred around the idea of The Macy Conferences. Therefore, in the early 1950s the authorities started to see the mathematician and author of the famous game theory, John von Neumann, as a leader of the new science. He applied studies on the creation of an artificial electronic brain, carried out by Warren McCulloch and Walter Pitts,⁸ and began to create a new dimension of cybernetics. In his vision this was supposed to be a science based on mathematics and logic, meant to develop automatic nervous systems and artificial intelligence, which was also to support the US army by equipping it with all kinds of

⁶ Richard Barbrook, *Imaginary Futures: from thinking machines to the global village*, London 2006, p. 48.

⁷ Norbert Wiener, *Cybernetyka, czyli sterowanie i komunikacja w zwierzęciu i maszynie*, transl. by J. Mieścicki, Warszawa 1971, p. 55.

⁸ Interestingly, at the onset of his research Wiener collaborated with both von Neumann and McCulloch and Pitts. On their difficult professional relations and consequences to the development of science, see: Flo Conway, Jim Siegelman, *Dark Hero of the Information Age. In Search of Norbert Wiener, the Father of Cybernetics*, New York 2005, pp. 129–235.

cybernetic service people who would be combat-worthy and able to perish in the event of a nuclear war.⁹ This is how the American version of cybernetics developed without its founder, Norbert Wiener.

In the meantime, in the 1940 and 1950s in the countries of the Eastern Bloc, the Stalinist regime used the principles of central planning not only in the economy but also in science, art and everyday life. As follows from the analyses of documents from that period as carried out by, e.g. Slava Gerovitch, Russian scholars were caught in a trap between enforced development and discovery of ever new strategies, especially in the manufacture of bombs and nuclear arms and a constantly fuelled propaganda that disparaged and criticised the achievements of Western science, treated as an evil and destructive force on human beings. In 1946 Stalin personally put forth the basic priorities for Soviet science, which was to become equal to and then superior to science from behind Soviet borders,¹⁰ and which in practice meant being inspired by, borrowing from and following American and West European accomplishments. The situation of the development of science was, then, paradoxical and extremely fragile. More innovative scholars and artists applying scientific theories were in fact walking the tightrope and were always at risk of surveillance and loss of life. Science was the property of the people in that it was supposed to serve the purposes of the military and economic growth. Under the Stalinist regime, leading Soviet scientists were especially opposed to cybernetics. Completely misinterpreting Wiener's doubts and moral concerns related to cybernetics, scientists clearly saw this science as a technocratic life-threatening pseudo-theory, a project of exterminating humanity, a form of debilitating human capacities for the sake of mechanical control of human activities.¹¹ The interdisciplinary nature of research held under the auspices of cybernetics, in particular the merger of biology, psychology and physics, mathematics and informatics, was unacceptable to the then regime. Stalin's clear division of disciplines, methodologies and schools was to help control scientific progress in particular areas and, therefore, the flow of ideas and concepts between them was negligible. The approach to science changed slightly with the end of Stalin's dictatorship. Nikita Khrushchev came to power, and along with him a group of scientists ready for innovation. Cybernetics began to be seen as a chance for economic development and a way of controlling industry on a mass scale. At the same time, it helped justify specific social and political changes.¹²

When in 1960 Norbert Wiener took part in a mathematics conference in Moscow, the question regarding technological progress of Eastern Bloc countries as one of Soviet Union's priorities was already obvious. Wiener himself was feted in Moscow as a science

⁹ See Barbrook, *op. cit.*, p. 50. John von Neumann suggested that the language of self-reproducing automats may be used in descriptions of the human brain and the computer, therefore we may create unlimited Artificial Intelligence which in many respects can surpass human capacities.

¹⁰ Slava Gerovitch, *From Newspeak to Cyberspeak. A History of Soviet Cybernetics*, Cambridge, Mass., 2002, p. 15.

¹¹ *Ibid.*, pp. 123-130.

¹² Barbrook, *op. cit.*, pp. 139-140.

rock star.¹³ In his book titled *Imaginary Future* Richard Barbrook writes that only a decade earlier the United States had enjoyed a cybernetic monopoly. Media and scientists in the USSR derogated the metatheory of their cold war opponent.¹⁴ Now cybernetics, introduced into universities, was to be a sign of modernity which was necessary as a rejuvenating force of the ruling party. Cybernetics societies were established in nearly every country of the Eastern Bloc – the Polish one was registered in 1962.

Taylorist discipline had lost its allure of organisational modernity. According to the reformers, the ruling party required a new vision of the socialist future if it wanted to rule over this new economic paradigm. Having fulfilled Stalin's goal of industrialising the Russian economy, the vanguard had to move on to tackling the tasks of the next stage of its world-historical mission. Under its leadership, the country's best engineers and technicians should focus their energies upon prototyping the cybernetic future. Russia's factory economy was already in the process of being upgraded into the Unified Information Network. By replacing Stalin with Wiener, bureaucratic Communism would be able to preserve its ideological hegemony over the imaginary future of proletarian communism. ... After decades of purges, wars, corruption and austerity, the promised land was within sight. By the 1980s at the latest, the inhabitants of Russia and Eastern Europe would be enjoying all the wonders of proletarian communism.¹⁵

By far the highest accomplishment of early science during the post-Stalinist political "thaw" was the Soviets' launching the first satellite into space in 1957. Theoretically, they were heading the exploration of the cosmos at that time. The Americans responded in 1960 by creating ARPA and, using the cybernetic gap, began work on a new global communication network. The Russians also tried to develop this version of communication.

In this Russian vision of the Net, two-way feedback between producers and consumers would calculate the correct distribution of labour and resources which most efficiently satisfied all of the different needs of society.¹⁶

The idea of developing a "computer language" as objective and rational, a basis for arriving at a new objective truth in science and society, was one of the major contributors to the development of cybernetics. Oskar Lange, one of the leading Polish cyberneticists and economists of the time, wrote as follows:

Mathematical programming enhanced by the use of computers is becoming the fundamental tool of long-term economic planning and of solving minor dynamic economic issues. In this application the computer does not replace the market; it plays the role the market would never be able to play.¹⁷

¹³ Ibid., p. 140.

¹⁴ Ibid., p. 139.

¹⁵ Ibid., pp. 144–145.

¹⁶ Ibid., p. 144.

¹⁷ Oskar Lange, "Maszyna licząca i rynek," in idem, *Dzieła*, vol. 2: *Socjalizm*, Warszawa 1973, p. 336.

It seemed then that for a short period of time cybernetic ideas dismantled the censorship of scholars, who were able to more openly practise in an interdisciplinary and innovative way. The artists thought likewise. When Lem published his *Obłok Magellana (The Magellanic Cloud)* in 1954, he was unable to use the word cybernetics for political reasons and replaced it with the term mechaneuristics; in the 1960s he was able to use it freely.¹⁸ However, did this turn towards cybernetics fundamentally change the relations of art and science in Poland, or was it a temporary revival of some possibilities which once more, for geo-political reasons, was not strong enough and lacked the conceptual foundations to be continued and developed?

Art and science during the post-Stalinist thaw

After a long period of Stalinist terror, mechanisation and streamlining the toil of the workforce, a moment came to return to the “human being” and his or her needs.

The challenge for communism was the rehabilitation of the human being (one which was nourished by “discovery” and publication of the early writings of Karl Marx which articulated his “dream of the whole man.” Exuberant scientism and doubting existentialism represented two poles of thought in the Thaw years (and after).¹⁹

In his text entitled *Nervous Systems: New Machines and Bodies in Polish Art and Film After the Thaw*, David Crowley highlights the fact that one of the major questions posed by the regime “elites” concerned the re-establishment and monitoring of man–technology relations as principal social challenges of the second half of the 20th century. At a time of a rebirth of cybernetics with a human face in Eastern Bloc countries, of scientific and technological progress foreshadowing an era of thinking machines, a global system of communications and biological transformations, these issues were the focus point of revised Marxist ideals. New methods of their social implementation were sought, and a time of experimentation and creating science and art laboratories followed.

In an air of a “scientific and technological revolution” the state permitted experiments in culture and science to be carried out not only by cyberneticists, psychologists or ergonomists, but also artists, film makers, architects, and musicians. Galleries, theatres, film and recording studios were described in the 1960s – by their creators – “laboratories” and artworks as “instruments.” Belonging to the newly-licensed zone of “experimentation” and sharing the official rhetoric of progress, these labs enjoyed resources and relative freedom from censorship.²⁰

¹⁸ See Joanna Kordjak-Piotrowska, “Art and Cybernetics in the Long Sixties,” in *Cosmos calling. Art and Science...*, p. 57.

¹⁹ David Crowley, “Nervous Systems: New Machines and Bodies in Polish Art and Film After the Thaw,” in *Cosmos calling. Art and Science...*, p. 31.

²⁰ *Ibid.*, p. 38.

It seemed then that Porębski's idea expressed in the late 1940s, which in reality had not been pursued and developed, would finally be implemented in new scientific and artistic practice. In fact, for over a decade this practice was successfully followed. It was during this period that Krzysztof Penderecki's and Eugeniusz Rudnik's unique musical compositions were created,²¹ created among others in the Experimental Studio of Polish Radio. It was then that work by such artists as Włodzimierz Borowski was created: in his series of *Pokazów synkretycznych* (*Syncretic Shows*) he stimulated and watched the reactions of viewers and subjected them to visual and sensory experiments. This was also a time of experiments conducted by Wojciech Bruszewski and Grzegorz Kowalski, at the end of the decade by Krzysztof Wodiczko, Ryszard Winiarski, Ryszard Waśko, and later of the *Elektroniczne antynomie* (*Electronic Antinomies*) by Janusz Połom, made in collaboration with engineers and programmers, or the avant-garde work of Zbigniew Rybczyński. This artistic practice of the 1960s and 1970s was underpinned by scientific concepts, the language of mathematics and computer science as well as early activities in the fields of biotechnology, neurology, cognitive psychology, new solutions in ergonomics,²² or physics. Many of the works have their conceptual dimension and deliberately experimented with the audiovisual form and new ways of recording and registering reality, but they also tried to extend the perception spectrum of their recipients.

The information turn that took place in the West in the 1940s, mainly thanks to the research and publications of Claude Shannon, was reflected in Polish art practice. Fascinations with mathematical models, cybernetics and feedback were not only to engage new engineers but also to be an important field of reflection for artists and humanists. At the same time, the fast-developing information theory (the zero-one system), which increasingly more often became a language of many disciplines, such as biology, chemistry and neurology, changed the way studies of life on and outside planet Earth were carried out. Not only machines and equipment but, first of all, a new programming language was developed. Information theory was to be the foundation for developing new tools in the humanities and social sciences, in methods of defining cultural phenomena, their course, flow, feedback or interferences. It was therefore extremely important to combine competencies, to transcend the boundaries of scientific disciplines and, finally, to seek new forms of education. In his treatise, first published in 1962 and delivered as a paper at a scholarly meeting of the Committee of Art Sciences at the Institute of Arts of the Polish Academy of Sciences in Warsaw, Mieczysław Porębski, when introducing the language of maths into research on art history, indicated the need to rework and reflect on new cognitive models that were indispensable to the emerging art combined with science and technology.

²¹ Eugeniusz Rudnik was one of the first makers of electro-acoustic music in Poland, an experimenter, author of *Skalary* and the first quadraphonic piece *Vox Humana*; he was interested in the relation between sound and qualities of space.

²² Ergonomics (including anthropometric studies) was one of the most robustly developing areas of studies on the human being in the 1950s and 1960s in Poland. The frequently resulting simplified cognitive models were criticised by, e.g. Krzysztof Wodiczko in the project called *Instrument Osobisty* (*Personal Instrument*) (1969).

According to him, in many respects it became a meta-art which revised former mythological narratives on reality and on itself, developing new reflections on their new forms. In conclusion, he stressed as follows:

After all we are dealing here with a separate, fledgling creative discipline which, not subverting anything, takes a position similar to that of meta-mythology with respect to mythology addressing old and contemporary works as well as what it does itself and what it finds as “ready-made” around itself. Defining their and its own essence, it constructs, as if separately for each new work (or rather for each of their new series), a separate non-transferrable technology, typology and morphology ... It provides information not on things, relations, impressions or images, but on the boundaries of information itself.²³

Porębski knew full well that the social transformations taking place on both sides of the Iron Curtain in the 20th century necessitated a redefinition of the tools of both artists and humanists. The meta-art he wrote about took care of the new forms of human perception, both audio and visual, and of the technological extension of human reception qualities. It was also to address permutation systems serving mechanisms and even forms of Artificial Intelligence. At the same time, in this paper Porębski points to one more important issue, namely that the new creative practice informs about “the limits of information itself.” This succinct phrase contains the very essence of what will be studied later on: the language of the new media, or a code, record which is “hidden” underneath the surface of things, where phenomena (irrespective of their nature and origin) may be expressed, recorded and, more importantly, processed and manipulated. In the *Iconosphere*, his best-known theoretical work, Porębski wrote as follows:

The “information boom” of recent years, who knows if not more threatening than the “demographic book” and “energy book,” is characterised not only by the inclusion of mass communications media but also their intensification, shock impact, assaulting ever more ruthlessly the recipient’s reception system. The ubiquitous image stereotypes, conventions and symbols encroach upon us, inform and deceive, encourage and warn. Has this boom not exceeded one or another escape velocity, when all ties with any tradition, both classical and conservative and subversive and innovative, cease to operate and new, previously unknown laws come into play?²⁴

However, back then these ideas were too complex and had to wait nearly thirty years to be revisited in the arts and humanities. In the 1960s and 1970s, technology was less advanced than that in the West or even in East Germany;²⁵ besides, the alleged political “thaw” proved short-lived and illusionary. After a moment of “a deeper breath,” censorship

²³ Mieczysław Porębski, “Sztuka a informacja,” in idem, *Sztuka a informacja*, Kraków 1986, p. 77.

²⁴ Mieczysław Porębski, *Ikonosfera*, Warszawa 1972, pp. 228–229.

²⁵ On the development of technology in East Germany, which was faster and different than that in Poland or in the Soviet Union, see: Dolores L. Augustine, *Red Prometheus. Engineering and Dictatorship in East Germany 1945–1990*, Cambridge, Mass., 2007.

returned, persecution of many artists continued, and technology was again perceived as related to the regime and oppression.

In the 1960s Polish industrial design was a major area for the development of the idea of combining art, science and technology. More often than not, the designs were of supreme quality and oftentimes went beyond the utilitarian function, thus paving the way for new artistic practices at the intersection of prototype engineering and artistic expression. Art and Research Studios (Zakłady Artystyczno-Badawcze ZAB, 1954-1977), affiliated with the Interior Architecture Faculty of the Academy of Fine Arts in Warsaw, were instrumental in the development of Polish industrial design at the crossroads of art and science. This was a place focusing on experiments at the intersection of arts and engineering sciences led by, e.g. Jerzy Sołtan and Oskar Hansen. This is how Wojciech Fangor describes his cooperation with ZAB when working on a project for Expo'58 in Brussels:

I was supposed to paint a frieze on this wall. On the outside: ruffled optical geometry, inside: blown-up children's drawings ... doing nothing. Władysław Gomułka said that Poland cannot afford such extravagance. The design was rejected.²⁶

One of the people who initiated and developed possible interaction between art and technology was Andrzej Pawłowski. Running the first Faculty of Industrial Form at the Academy of Fine Arts in Krakow in Poland in the early 1960s, he emphasised setting up interdisciplinary teams in educating new designers. According to him, a designer needs to collaborate with engineers in charge of particular production issues, must increase his or her knowledge regarding sociology, economics, material technology, processing techniques, automation and security, and also assume social responsibility for a given work.²⁷ Pawłowski had a very unique approach to technology. He was fully cognizant of the threats of scientific acceleration of the 20th century. He wrote as follows:

The dynamic development of our civilisation is increasingly a reason for a dangerous imbalance. Human "development" and "existence" are at risk of an "unbridled" progress of the technological and industrial civilisation.²⁸

Janusz Krupiński believes that:

Pawłowski's optimism is inspired by the hope that it is precisely industrial design which will be able to curb, harness, tame and direct the technological and industrial civilisation and convert it into a genuine culture.²⁹

²⁶ Marcin Wicha, "Fangor: od 'Lenina w Poroninie' do designu," *Dziennik.pl* [online], 2008, 6th December, available from: <http://kultura.dziennik.pl/artykuly/83958,fangor-od-lenina-w-poroninie-do-designu.html> [accessed: 30 July 2014].

²⁷ Andrzej Szczerski, "Designing Designers – Industrial Design at the Academies of Fine Arts," in *Cosmos calling. Art and Science...*, pp. 173–174.

²⁸ Andrzej Pawłowski, *Inicjacje. O sztuce, projektowaniu i kształceniu projektantów*, ed. and selection J. Krupiński, Warszawa 1987, pp. 46–45.

Design, according to Pawłowski, involved the introduction of specific principles into the chaotic techno-cultural reality and attempts made by humans to harness scientific discoveries. When defining design models, Pawłowski was inspired by a method that was extremely popular in the 1960s and 1970s known under the acronym TRIZ (Theory of Inventive Problem Solving, or Theory of Inventive Question Solving), developed by the Soviet scholar Henryk Altzuller.³⁰ In his famous book under the much-telling title of *Algorytm wynalazku* (*The Algorithm of Invention*), which was widely commented in the Eastern Bloc, the theoretician called for heuristic programming, or establishing activities necessary in the practice of invention.³¹ By combining Marxist dialectics with a systemic and scientific approach to education and problem solving, Altzuller wrote:

The entire sense of the inventiveness theory consists in fact in its allowing us to find a solution to a task deemed as creative today, at a level of organisation of mental work to be reached tomorrow.³²

The method was in fact a Soviet response to all kinds of versions of so-called design thinking which also dealt with efficient and systemic problem solving.³³ The rational approach to problem solving was to facilitate “moving step by step to a successful solution” and was known as the Algorithm of Inventive Question Solving (AIQS).³⁴ The algorithm as defined by Altzuller was a protocol made up of a description of directed actions. It was also to stimulate the discovery of the inventor’s identity features necessary for the actions and was composed of three principal stages: analysis, elimination of technological contradiction (operational stage) and correction (synthetic stage).³⁵ Naturally, thinking about the algorithm as a form supporting the practice of inventiveness was to work out a common strategy for emergent technological reflection. Despite the theoretician’s assurance that he “does not ignore the human being,” this was a rather mechanical programme fostering not so much creativity but efficient solutions to technical and scientific problems. No doubt this was a major basis for educating future designers as it systematised the creative process and linked it inseparably with realistic tasks. The invention algorithm was not

²⁹ Janusz Krupiński, “Andrzeja Pawłowskiego koncepcje wzornictwa,” [online], available from: http://www.krupinski.asp.krakow.pl/content.php?page=docs/pawlowskiego_koncepcje_wzornictwa.htm&type=teksty [accessed: 2 March 2014].

³⁰ Before World War II he was a promising engineer and theoretician, during Stalinist times he was banned from practising his profession, and after the “thaw” his concepts regained popularity and were the basis for teaching designers in many countries of the Eastern Bloc.

³¹ Henryk Altzuller, *Algorytm wynalazku*, transl. by T. Nowosad, Warszawa 1975, pp. 39–40.

³² *Ibid.*, p. 52.

³³ Suffice it to mention the ideas of the World Game by Buckminster Fuller from the 1960s, see Agnieszka Jelewska, *Ekotopie. Ekspansja technokultury*, Poznań 2014, pp. 168–171, or the ideas and practices of *design engineering* described, e.g. in Robert McKim’s *Experiences in Visual Thinking* (1973), one of the sources of inspiration for the development of *design thinking* as an educational model at Stanford University.

³⁴ Altzuller, *op. cit.*, p. 86.

³⁵ *Ibid.*, pp. 87–91.

supposed to unleash new design thought but to streamline the efficiency of action. We must remember that it was a form of programming work and action subject to a system, although many of these, thanks to the designer's special talents and capabilities, went beyond the superimposed pattern. A case in point is the history of Polish rocket research that was conducted, for example, by Jacek Walczewski at the University of Science and Technology in Krakow in the Unit of Rocket Technology he set up in 1957. After initial success this work was discontinued due to pressure from the "Eastern neighbour."³⁶

And so, following a short period of development of art and science projects, once again it turned out that experiments could be performed in strictly defined frameworks and under designated principles. Joanna Kordjak-Piotrowska observes as follows:

The decline of the Gomulka era saw the end the myth – dating back to the post-Stalin Thaw of the mid-1950s – of the artist designing a new, high-tech reality in close collaboration with engineers, constructors, mathematicians. Instead, artists and critics started voicing a sense of doubt or irony concerning the ideology of technological progress; the notion – fundamental for the 1960s – of science as a "universal remedy for all of humanity's ills" was found to be flawed.³⁷

When at the turn of the 1970s the USA was a country where conscious art and science practice consisted in reclaiming military and systemic technologies for their social and communication use, or for a critical reflection on the relation of nature, humans and technology, interest in these issues in Poland had actually started to wane. The events of 1968 were a serious foreshadowing of a new propaganda and of more stringent censorship. Again, tanks appeared on the streets and once again the social and everyday experience of technology became largely negative. The disappointment with the expectations that artists and scientists had with respect to relations between art and technology is linked with the loss of society's faith in a possible redefinition and in changes of the system's elements, which the regime promised following Stalin's death, including new experiments in education or actions for the sake of culture. Characteristic for this situation is also the creative biography of Grzegorz Kowalski, one of the major Polish artists of the second half of the century. He is a graduate of the Sculpture Faculty of the Warsaw Academy of Fine Arts and a disciple of, e.g. Oskar Hansen, whose concept of the "Foma Otwarta" ("Open Form") was for him one of his major inspirations. In the 1960s he also collaborated with Mieczysław Porębski and took part in his seminars on science and art at the Warsaw Academy of Fine Arts (within an inner circle of the initiated, next to, e.g. Feliks Falk and Ryszard Winiarski).³⁸ Importantly, Kowalski's piece of work for graduation in 1965 was a design, a model of a *Pomnik energii jądrowej* (*Nuclear Energy Monument*), a work that is deeply critical of instrumentally treated science, of the madness of nuclear arms development and a powerful statement against the threat of annihilation of the world. This work also

³⁶ A description of the entire project: <http://rakietypolskie.pl/opis> [accessed: 14 July 2014].

³⁷ Kordjak-Piotrowska, op. cit., p. 67.

³⁸ Ibid., p. 52.

consisted of two famous elements which differently treated the question of cognitive psychology, neurobiology and engagement of viewers' senses, i.e. the *Studium przestrzeni percypowanej przez zmysły: równowagi i dotyku* (*Study of Space Perceived by the Senses: of Balance and Touch*). These were actually attempts at a very subtle implementation of the idea of introducing the viewer into new perception environments. In the last two works the artist himself used terms inspired by Porębski's texts, e.g. a "set of stimuli" or a "set of receptors."³⁹ As Maryla Sitkowska claims:

Grzegorz Kowalski's early work coincided with a rebirth in the movement of symposia and avant-garde workshops with a science and social programme (integration with different groups of recipients, developing new kinds of art patronage by, e.g. large factories). Kowalski took part in some major events of this movement, such as the 1st Symposium of Visual Artists and Scientists called "Art in the Changing World" in Puławy (1966), the 2nd Biennale of Spatial Forms in Elbląg (1967), the 5th Koszalin Workshop in Osieki (1967), and the Visual Arts Symposium "Wrocław'70." The common denominator of works made and shown at the above symposia was their capacity to be transformed by the viewers' interference. This was, e.g. the *Kompozycja okolicznościowa* (*Commemorative Composition*) from Puławy (1966) and the *Kompozycja aktualna* (*Current Composition*) at the São Paulo Biennale in 1969.⁴⁰

By the late 1960s Kowalski already senses a profound hiatus between the ideas of combining art and science to explore human perception and the political and economic situation. He participates in a scholarship programme in the US and on coming back begins a period which he himself defines as "practising freedom against censorship and political oppression"⁴¹. His teaching will in the 1990s contribute to the establishment of a studio with the informal name of Kowalnia (Smithy), which laid the foundations for Polish critical art and which in a large measure was anti-scientific and anti-technological.

In the late 1970s the idea of bringing together art and science, not necessarily via cybernetics or informatics, but conceptually and formally, was implemented by the artists gathered around the Film Form Workshop in Łódź (1970-1977), e.g.: Józef Robakowski, Paweł Kwiek, Wojciech Bruszewski and Zbigniew Rybczyński. Alicja Cichowicz writes:

Members of the FFW showed an intellectual approach to art, combining a constructivist worship of technology with artistic methods based on science. They wished to discover significant and unique features of the film message and the material and technological conditions. They analysed the interrelations between elements of construction of a film work: space and time, image and sound, as well as the questions of the relation between film and reality and perception physiology. Studies on the medium's structure were enhanced by theory and criticism; they published their own periodical ("Zeszyty WFF") with lectures, projects documentation and methodological analyses of their work.⁴²

³⁹ Ibid., p. 51.

⁴⁰ <http://culture.pl/pl/tworca/grzegorz-kowalski> [accessed: 15 August 2014].

⁴¹ <http://culture.pl/pl/tworca/grzegorz-kowalski> [accessed: 15 August 2014].

⁴² <http://www.robakowski.net/tx45.html> [accessed: 7 July 2014].

They deemed as important the Constructivist tradition, works by the Themersons as well as ideas espoused by Strzemiński and Kobro in their understanding of abstraction, approach to scientific research and art and to form as a carrier of imagery. Rejection of a classical film plot, protagonist construction and a linear sequence of events pushed these artists, each in his or her own way, to the meta-film level. Their artistic statements try to define their new ways of perception, systems of recording and technological recorders of reality.

The Film Form Workshop – writes Ryszard W. Kluszczyński – emerging at a time of special intensification of conceptualist tendencies in art and of the development of structural cinema, naturally joined the community of artists who rejected the traditional aesthetic stand for the sake of the cognitive one and – patterned on the philosophical school of positivists – regarded their communication capacities as the only to be noteworthy. Members of the “Workshop” found their own way within a broadly construed conceptualist movement in art, tapping into the traditions of the Polish (and Russian) artistic avant-garde of the 1920s and the 1930s. The ideology and practice of Constructivism was in this way an important source of inspiration for the arts and theory.⁴³

What was important was then the search for a language arising from the recording technology rather than from literary narratives, as Paweł Kwiek observed in *1,2,3... ćwiczenie operatorskie (1,2,3 ... Operator's Exercise)*, in which he discussed the new approach to the process of film making:

I begin to wonder what will appear on the screen. What will the film be about? I think that deep down it will be about nothing. I approve of the absence of meaning or rather the absence of the significance of the film. Actually, the 3 minutes of my life in which I did what I did under the influence of the camera did not matter either.⁴⁴

Some of the WFF members, e.g. Kwiek and Robakowski, treated art as a trans-disciplinary form, combined performative activities and film, tested interactions between bodies and recording devices, pursued “non-human,” non-classical forms of recording reality, and followed and showed emergent models of interaction between the human somatic and its technologically generated images. Others, such as Wojciech Bruszewski, experimented with generativeness, recursiveness and randomness, thus laying the foundation for Polish interactive art.

In 1972, in the early stage of his career, next to the permutational *Bezdech (Apnea)* film (a linear combination of different sets of the same elements), Bruszewski created, moreover, a generative and permutational object, *Nowe Słowa (New Words)*, which could generate 256 different combinations of letters-components. Most of them did not have the status of words in the Polish language but were a potentiality.⁴⁵

⁴³ Ryszard W. Kluszczyński, “Przestrzeń generatywności. Wprowadzenie do twórczości Wojciecha Bruszewskiego,” *Dialog*, no. 7–8, 2012, p. 152.

⁴⁴ <http://culture.pl/pl/tworca/warsztat-formy-filmowej> [accessed: 12 March 2014].

⁴⁵ Kluszczyński, op. cit., p. 157.

In the late 1960s the Soviet regime was increasingly brutal in its praise of a utopian techno-human future, although access to technology in Poland or the USSR remained negligible, incomparable to that in the West or even East Germany, where the situation of the flow of ideas and scientific and technological progress assumed a different course. This change of political course also affected the disillusion with ideas of merging art and technology and extended anew the gap between the humanities and the exact sciences, thus distancing the countries of the Eastern Bloc from the art of the new media and the emergent *art&science* practices which began to flourish in the West.

Aksel Berg, chairman of the Council on Cybernetics, one of the most vociferous advocates of technological progress, stated in 1967:

When computers appear in our homes ... we will no longer need to call a doctor; a machine will tell us what to do. Students will not have to visit some places and listen to absurd lectures by retirees who know nothing any longer; programs will be optimised and you will be connected to a machine; this connection will flow like water and light in your homes ... If someone does not believe, let them commit suicide. This is our future, after all; we shall fight for it and eliminate all standing in the way.⁴⁶

This military and revolutionary stylistics was to express the assumptions of the ideology of progress which no longer made believe that it was a new form of freedom. This was perfectly well addressed by Stanisław Lem:

We ascend to ever higher levels of military technology, as a result of which not only conventional armoured trains and bombers, not only strategies and staffs, but the very essence of global antagonism becomes obsolete. I do not know which direction it will evolve into.⁴⁷

This famous quote comes from the introduction to Lem's philosophical essays, published under the title *Summa Technologiae* in 1964. Although writing behind the Iron Curtain, Lem was aware of many of the processes which transformed societies on either side of the cold war conflict. The development of technology in the second half of the 20th century was linked with major problems the human race was facing at that time, e.g. anti-humanist tendencies identified in the West with the names of, e.g. Michel Foucault and Jacques Derrida, the technocratic visions of the new society of Jacques Ellul and Lewis Mumford, the extension and cyborgisation of body and mind (Marshal McLuhan), the network as a new model of global communication, the conquest of outer space as part of the cold war arms race, and the emerging movements of political revolutions and transformations.

In his *Summa Technologiae*, Lem was mainly concerned with the human being who designs and is fitted with new survival technologies. The human being as described by Lem has long ceased to believe in the infallibility of his or her agency and has begun to

⁴⁶ Gerovitch, op. cit., p. 255.

⁴⁷ Stanisław Lem, *Summa Technologiae*, 2012, [electronic edition], p. 36.

discover him or herself as an element of the ecosystem. It is from this perspective that we should interpret the writer's aversion to the demands of humanism, unthinkingly repeated in the humanities and philosophy.

I trust no pledges; I believe no assurances underpinned by so-called humanism. The only way to deal with technology is another technology. Human beings know today more about their dangerous inclinations than a hundred years ago, and in another hundred years this knowledge will be even better.⁴⁸

The human being was defined by Lem as an evolutionary element of new technology, a science which, when technologically enhanced, indicates human forms of coexistence with Earth as a planet. However, Lem in many respects harboured no illusions that this coexistence is not homeostatic, as some theoreticians of cybernetics believed. "Because, unlike most animals, the human being can not only adjust him- or herself to the environment, but actually adjusts this environment to his or her needs."⁴⁹ Each technology is double-edged. It may be both a form of administration and destruction as well as of support and development. However, the 20th century clearly demonstrated that not infrequently the two issues began to cling to each other and were spheres of human activity which were difficult to be teleologically and ethically differentiated. Lem's essays provide an image of a cybernetically educated science-fiction thinker and philosopher who recognises and tries to pursue the traces, fragments, signs and omens of the techno-cultural paradigm at the foundation of modernity, where technology is not merely a context, commentary and instrument but where it co-creates possible models of human existence.

The advancement of scientific and technological progress has become so clear that one does not need to be a specialist to notice it. I believe that the changeability of living conditions caused by this advancement is one of the factors which affect the establishment of the homeostatic systems of morals and norms of the present-day world. When the entire human life of the following generation is no longer a repetition of parents' lives, what kind of guidelines and knowledge can be offered by the experienced elderly to the young? The truth is that the interference in the patterns of activity and its ideals by the very element of incessant change is masked by another process, far more conspicuous and definitely more serious in its direct consequences, i.e. accelerated oscillations of the self-begetting system with a positive feedback with a very weak negative component, i.e. the East–West system which over the past years has oscillated between series of global crises and denouement.⁵⁰

Lem indicates, first of all, a new set of ethical and cultural problems arising from developments in genetics, biotechnology, neurology and psychology that redefine the notion of natural heredity of the human race. This, according to the writer, will result in rudimen-

⁴⁸ *Ibid.*, pp. 19–20.

⁴⁹ *Ibid.*, p. 18.

⁵⁰ *Ibid.*, p. 22.

tary changes in norms, behaviours and morals. The issues foreshadowed by Lem are today one of the most important ones for the scientific discourse and practice of both the exact sciences and the humanities and arts on a global, ecological and existential level. However, the most important and direct dimension of techno-culture for Lem in the 1960s was the cold war system of feedback between the United States and the Soviet Union. The system, based on a military technological race, determined the principles of information flow and of the use of this information and its social implementation. It moreover impacted the entire biosphere, as Lem wrote, with radioactive waste, nuclear tests, threat of deployment of chemical weapons, and the possible annihilation of the entire planet.

The Long 1980s

Due to the political, economic and cultural situation in the long decade of the 1980s in Poland (reaching into the 1970s, with ramifications still in the 1990s), it is difficult to mention any circumstances conducive to the development of experimental artistic phenomena at the intersection of art, science and technology. Actually, from today's point of view it is difficult to imagine responsible art which would not become directly and critically involved in the support of movements fighting for freedom and civil liberties. Because of that (and because access to new technologies in Poland was not easy), in fact media art (technological) did not develop. The new strategies of pursuing art in an interdisciplinary dialogue with science and technology originating in the 1960s and 1970s were pushed aside and gave way to what were at that time significant forms of social commitment, less focused on designing and more on critical activism. In the long 1980s, technology is practically entirely associated with the military regime; not only with tanks and armoured vehicles on the streets but also with a broadly construed computer culture whose development is controlled, blocked and superimposed. While personal computers addressing a wide market appeared in Western Europe, in Poland, although we had our own Odra computers in the Wrocław-based Elwro factory, they were mainly used in the industry and strictly in science. In such a reality computers could not be seen as a factor allowing artists to "reclaim in a partisan fashion" the technological media for the sake of independent communities, which was an especially characteristic feature of the processes of mediation of reality in Western Europe and in the USA.⁵¹

Another phenomenon sprang up in Poland at that time – in the first half of the 1980s it helped establish proto-networks based on strategies of media exchange. Characteristic for that period was the intense explosion of the music community, especially of independent rock, punk and new wave artists. Their concerts gathered crowds of young people. A music festival was held in Jarocin and was treated by the regime as a kind of safety valve, and probably because of that it was tolerated. Still, the growing music fashion and

⁵¹ See Jelewska, *op. cit.*, pp. 79–111; 157–187.

access to cassette recorders facilitated the birth of new forms of independent media communication. Concert audiences not only listened to the music but also often recorded it on portable cassette recorders, then copied the recordings and made them accessible to others. This gave birth to the underground publication market, free from the impact of censorship and based exclusively on the exchange of recordings between users. Bands did not need to officially release their records as everyone knew their repertory thanks to bootlegs, or pirated recordings made during concerts. This extremely interesting phenomenon was to a large extent instrumental in a critical reflection on the culture of the then generation, for whom art and artistic practice were a form of community experience, by definition belonging to the public domain. This media and community paradigm, unconsciously resorting to the ideas of media piracy, was one of the most important factors in the development of an independent culture in Poland. Despite the ever stricter political repressions of many artists, grassroots counter-culture phenomena began to expand their impact zones. Symbolic manifestations of this phenomenon included a banner that conceptually and critically referenced the technological experience of the modern person. The poster in question is "Cosmic Solidarity," hung on the bus of the Brygada Kryzys band in 1981 shortly before the imposition of martial law. The power of contesting the military culture of the Eastern Bloc was expressed in many ways by the young generation. One punk band established in 1981 called itself SS-20, after the Soviet rocket for launching nuclear warheads.⁵² Another band, Moskwa, set up in 1983, composed a song titled *Światło atomowe (Atomic Light)*:

Światło atomowe zabija dziecku wzrok
 Ciała nieruchome i pokrwawione są
 Światło atomowe wyciska z mózgu sok
 Ciała nieruchome do śmierci tylko krok

Bomby, miny, karabiny, czołgi
 To już historia!
 Wybuch jądrowy, grzyb atomowy
 Nie do obrony!

(The atomic light destroys a child's eyes
 Bodies in blood keep silent
 The atomic light squeezes out our brains
 Bodies are still, a step from the grave

Bombs, mines, guns and tanks
 Are a song of the past!
 An A-bomb explosion
 Doesn't leave us that fast)⁵³

⁵² Later they changed their name to *Dezerter*.

⁵³ Moskwa, *Światło atomowe*, <http://www.moskwa.band.pl/teksty/> [accessed: 10 August 2014].

In turn, the first song of the black album of Brygada Kryzys, entitled *Centrala (Headquarters)*, addressed the heightened state of turmoil and the awaiting of a signal from the Headquarters which, as Robert Brylewski maintained at that time, were the Gdańsk offices of the Solidarity movement.

Czekamy na sygnał
Z centrali!
Czekamy, czekamy ...
Wszyscy na jednej fali!
Centrala nas ocali

(We wait for a signal
Sent from our HQ!
Awaiting a signal,
All on the same wave!
The Headquarters will save us!)⁵⁴

The counterculture and opposition activities of many artists sentenced them to life in an economic and political underground. Access to technological advancements or the practice of meta-art, once promoted by Mieczysław Porębski, was out of the question. When the world was truly entering the era of conscious and socially-involved forms of cyber-culture, hacking, the art of the new media and other artistic activities, in Poland, naturally, there was no impetus for the development of a computer culture and technological art in a democratic dimension, liberated from the impact of the monitoring agendas of the state. Nevertheless, the history of Polish informatics is marked by outstanding accomplishments, such as the AKAT-1 computer designed by Jacek Karpiński in 1959. This design won the world competition for technical talents held by the UNESCO. Thanks to this Karpiński was able to go abroad and study, e.g. at MIT. As it later turned out, he was an informer of Polish economic intelligence under communism. Finally, AKAT-1 was never mass produced since no parts for its manufacture could be legally purchased in Western Europe. In the 1970s Karpiński designed another spectacular computer, the K-202 which had ample computational capacities, but only 30 copies were made and sold to various Polish and foreign institutions. This was how most Polish designs finished. Because of the Iron Curtain it was impossible to establish contacts with Western industry and, therefore, domestic designs were doomed to live a short life. Informatics and the attendant computer culture thus became a theoretical discipline resembling reality from an anecdote quoted by Lev Manovich in *The Language of the New Media*:

Moscow, 1975. Although my ambition is to become a painter, I enroll in the mathematical ("matematicheskaya") high school, which in addition to a regular curriculum has courses in

⁵⁴ Brygada Kryzys, *Centrala*, <http://www.brygada-kryzys.art.pl> [accessed: 10 August 2014].

calculus and computer programming. The programming course lasts two years, during which we never see a computer. Our teacher uses a blackboard to explain the concepts of computer programming. First we learn a computer language invented in the Soviet Union in the late 1950s. The language has a wonderful Cold War name: "Peace-1" ("MiR-1"). Later we learn a more standard high-level language: ALGOL-60. For two years, we write computer programs in our notebooks. Our teacher grades them and returns them with corrections: missed end of the loop statement, undeclared variable, forgotten semicolon. At the end of the two-year course, we are taken – just once – to a data-processing center, which normally requires clearance to enter. I enter my program into a computer, but it does not run: Because I had never seen a computer keyboard before, I used the letter *O* whenever I need to input zero.⁵⁵

In the long decade of the 1980s we can still discover flickers of new computer-related thinking. Domestic factories, with the largest one being Elwro and MERA-ELZAB, MERA-KFAP and UNIMOR began the manufacture of various versions of computers for office work, accounting and design. A microcomputers company set up in the mid-1980s composed of a dozen or so Polish brands manufacturing electronic devices prepared the production of a clone of the IBM PC/XT computer (on the Western market since 1983) known as Mazovia 1016, but eventually production of this machine never took off and the entire project fell through. Despite the setbacks, in Poland we could also encounter single copies of computers brought from abroad by private individuals. And thus the computerisation tendency became an expanding idea that transformed the Polish landscape of culture and creative practice.

The level of interest in computer culture is also evident through the emergence of popular magazines on the topic on the market. *Bajtek*, set up in 1985 and published continuously for eleven years, helped us stay posted on relevant issues. It was edited by Władysław Majewski until 1989 and was an insert in the *Sztandar Młodych* daily newspaper for young people; only after the democratic transformations did it become an independent magazine. The role of promotion and education that *Bajtek* played was significant indeed. First of all, it introduced to the general public discourse connected with computer culture. More importantly, however, it helped set up a non-institutionalised (non-academic, non-official) milieu interested in new technologies. However, all of this was too little to produce phenomena such as the makers in Western Europe or in the US, although the first symptoms did emerge.

The first issue of *Bajtek* contained an interview with Władysław M. Turski, professor at both Warsaw University and London University, the then president of the Polish Informatics Society. Asked about the threats of the absence of IT literacy, Turski bitterly summed up the status quo of Polish computer culture of the 1980s:

Despite a wave of public yet superficial interest in IT issues (actually in its visual side), the threat (of civilisation and intellectual colonisation) not only exists ... but has deepened over the

⁵⁵ Lev Manovich, *The Language of New Media*, Cambridge 2001, p. 3.

last six years,⁵⁶ when nothing was done to lay the uses for IT in Poland on solid foundations than before. ... This process, regrettably, continues; it is accompanied (and in large measure caused) by the phenomenon of continued obsolescence of computer equipment at universities. ... While five years ago in the few informatics institutes the matter was treated seriously and we educated students on more or less the same level as average universities abroad, now we are completely unable to do so. Not only do we not have equivalent or only slightly less advanced machines, but we actually have no machines to help us educate students in the area of, say, computer graphics or high-tech ergonomic systems of access to computers.⁵⁷

Despite the lack of direct access to computer hardware, slowly in some Polish homes we could come across such computers as Commodore 64, ZX Spectrum, and all models of Atari and Amiga at the turn of the decades. Available at the same time were also Russian copies of game consoles, such as Exi-Video 01 or later Videosport-3. Owning a Commodore, Spectrum or Atari was a sign of entering a new circle of social relations. First of all, the low accessibility of computers caused fast development of networks of people with computers and exchanging cartridges, pirating cassettes or later discs. Interestingly, bringing computers from abroad had its impact on democratisation processes in Poland. In line with the ideas of contemporary design, by entering the zone of Western computer culture we annexed certain ideas of culture in which the computational machines themselves were designed.

Designed in the 1980s for fast communication, sharing experience and pursuing opportunities for development based on the free flow of data, computers in Poland slowly became symbolic of a new reality, which was later to change such culture zones as artistic creativity itself, steadily changing the array of choices of creative practice.

The 1990s is a decade of a new paradigm of the global digital culture. The media culture begins to spread between many transmission media, starting from satellite TV (a sign of the times in the 1980s⁵⁸) through cellular phones, to the revolutionary changes following global accessibility to the Internet. The essence of this new cultural paradigm is significantly emphasised by Lev Manovich. In the introduction to the *The Language of the New Media* he wrote as follows:

In 1995 the Internet appears – the most material and visible sign of globalization. And by the end of the decade it will also become clear that the gradual computerization of culture will eventually transform all of it. So, invoking the old Marxist model of base and superstructure, we can say that if the economic base of modern society from the 1950s onward starts to shift toward a service and information economy, becoming by the 1970s a so-called “post-industrial

⁵⁶ The time which elapsed since the publication of Władysław M. Turski's book entitled: *Nie samą informatyką* (Warszawa 1980).

⁵⁷ Władysław Turski, “Matchbox dla szofera,” *Bajtek*, no. 1, September 1985, pp. 3–4.

⁵⁸ It is worthwhile at this point to recall the artistic manifesto of Nam June Paik entitled *Art and Satellite* of 1984. See Nam June Paik, “Art and Satellite,” in *Multimedia from Wagner to Virtual Reality*, ed. by R. Packer, K. Jordan, New York 2001, p. 39.

society" (Daniel Bell), and then later a "network society" (Manuel Castells), by the 1990s the superstructure starts to feel the full impact of this change. If the postmodernism of the 1980s is the first sign of this shift still to come – still weak, still possible to ignore – the 1990s' rapid transformation of culture into e-culture, of computers into universal culture carriers, of media into new media, demands that we rethink our categories and models.⁵⁹

Poland is fast-tracked to the new reality; the globalisation processes ushered in by the digital media coincided here with the transformation of the political system and with democratic access to culture and technology. Yet the introduction of capitalism bore fruit with intense transformations felt there and then. Virtually overnight Poland became part of the galaxy of the new world of supply and demand. The unmistakable climate of trade fairs, which operate until today, was dominant in Poland long before the new shopping centres offered brand-name products. We constructed capitalism in the media to a large extent through piracy: vending stalls were full of illegally copied cassettes and videos, CDs burned at home and floppy disks with computer games. For many private entrepreneurs the bazaars were a springboard for a new dimension of doing "business." Computers were more and more commonplace, and watches and bicycles were replaced as the most popular presents offered on the occasion of one's First Communion by Pegasus game consoles and satellite dishes. New television and radio stations emerged, often local, with no legal authority to broadcast. This first stage of Polish democracy was no doubt a form of compensation after years of not being able to own and access media and technological advancements.

When the West started to be profoundly critical of the new media, net art or the paradigm of *art&science* with reference to culture and social qualities, during one decade Poland had to move from stalls with pirated video cassettes to the question of copyright on the Internet. To some extent Polish media culture of the 1990s is a form of a piracy culture.

Two works by Krzysztof Wodiczko are an interesting comment on the transformations of Polish technological culture along with its dystopian dimension of the 1980s and the emerging hyper-consumption of home electronic devices of the early 1990s. He made these works in the 1980s before he emigrated from Poland, creating abroad leading works of global media art.

To commemorate the anniversary of Hitler's attack on Poland, in 1985 Wodiczko presented one of his public projections in Warsaw, most often on monuments or public buildings. Commenting on the political situation of the Eastern Bloc, the artist projected onto a copy of the Colleoni Monument in the yard of the Academy of Fine Arts an image of a tank (on a plinth), a skeleton of a horse (horse) and a police baton (instead of the original weapon). When comparing this apocalyptic image of Wodiczko's projection with his later work, made in Berlin in 1990 shortly after the fall of the Berlin Wall, one may create a condensed and provocative history of Poland's difficult road to democracy and the creation of

⁵⁹ Manovich, *op. cit.*, p. 6.

the culture of hackers or makers. Wodiczko projected onto the Berlin-based Lenin Monument an image of a vendor from Poland, dragging behind him a trolley full of cheap electronic equipment, a representative of what we might call an apostle of private property. All of a sudden we can own technology, Wodiczko implied, but we cannot do much with it. For us it is but a pile of equipment to be bought and sold; we still do not regard it as a major tool of social critique of the media and we still have not regained technology in the artistic or cultural respect, but only as a consumer item.

At that time critical art was one of the clearest phenomena of art life. It was rooted in the contestation culture of the 1980s. In fact, this very last decade of communism was the time of birth of a model of critical art in Poland, marked on the one hand by the symbolic *Polentransport* by Joseph Beuys of 1981, when the artist donated over three hundred of his works to the collection of Muzeum Sztuki in Łódź, believing that the ideas of Solidarity are a real fulfilment of his artistic and political demands of the third way. On the other hand, it was marked by the art of the founding father of the critical current in Poland, Zbigniew Libera, who was involved in *Kultura Zrzuty* in the early 1980s.⁶⁰ It was in the mid-1980s that Libera's first video observations were made: *Obrzędy intymne (Intimate Rituals)*, *Iskra (Spark)*, or a later work called *Jak tresuje się dziewczynki (How To Train Little Girls)*.⁶¹ No doubt at that time, strong interest in the human body in its social, political and performative aspects became the prime focus of Polish art. Few artists in Poland addressed the relation between the body and technology.

Actually, it was only at the beginning of the new millennium that a new awareness of technological tools and artists' interests in them were born. This applies especially to the generation of the digital natives, with their new experiments and other creative practices. They increasingly more often used scientific ideas to expand the field of their explorations. The first media labs were set up, being collectives of artists, scientists and engineers, offering work at the crossroads of various creative disciplines and theoretical discourses. After years of oblivion, ideas of experimental studies and research and art centres in and outside of universities reappeared. There were more and more participatory initiatives open to media education, projects combating technological exclusion of specific social groups and concepts of building relations between art and science, which had been dormant in the 1980s and 1990s, and confirmed by this very publication. New creative practices often surprise, change one's perception perspective and introduce major chang-

⁶⁰ *Kultura Zrzuty* was active from 1981–1987. This was an informal group of young artists, e.g.: Włodzisław Adamiak, Zbigniew Wińczyk, Andrzej Ciesielski, Andrzej Dudek-Durer, Janusz Dziubak, Jerzy Frączek, Henryk Jasiak, Jacek Józwiak, Jacek Kryszkowski, Zbigniew Libera, Łódź Kaliska, Zofia Łuczko, Mikołaj Malinowski, Anna Płotnicka, Waclaw Ropiecki, Zygmunt Rytka, Tomasz Snopkiewicz, Andrzej Sulima-Suryń, Jerzy Truskowski, Zbyszko Trzeciakowski and Grzegorz Zygier.

⁶¹ Polish critical art of the 1980s and 1990s was often analysed in scientific texts. See e.g. Jacek Zydorowicz, *Artystyczny wirus. Polska sztuka krytyczna wobec przemian po 1989 roku*, Warszawa 2005; Izabela Kowalczyk, *Ciało i władza: polska sztuka krytyczna lat 90.*, Warszawa 2002; Anda Rottenberg, *Przeciąg: teksty o polskiej sztuce lat 80.*, Warszawa 2009.

es and redefinitions in the very complicated paradigm known as art. Many of the practices elude traditional artistic criteria and move towards the interdisciplinary and transdisciplinary, as to both the tools used and the messages conveyed. In his *Ikonosfera* of 1972, Mieczysław Porębski expressed this very state of affairs. In the fourth part of his treatise called *Mechanizmy i strategie wyboru*, he addressed one of the most difficult topics in reflection on art, i.e. the limits of art and its assessment. He wrote that art is involved in a permanent game trying to salvage its traditions, while new phenomena, also on the relations between artistic and scientific work, emerge with difficulty, are unique and disseminate slowly.⁶² He summed up:

This is the game art is playing today, its strategic goal being the preservation of its own continuity in our variable world, which is not stationary but highly cumulative, where continuity is preserved not by a strict enforcement of identity but, conversely, by consent for its rejection and consequently by a constant expansion of the category of phenomena traditionally seen as "artistic." In this way each "strategic" deviation from the norm is nothing else but a flexible form of adjustment under chronic variability.⁶³

Referring specifically to the information turn, he boldly asked:

Has this boom not exceeded one or another escape velocity, when all ties with any tradition, both the classical and conservative one and the subversive and innovative one, ceases to operate and new, previously unknown laws come into play?⁶⁴

While writing these words over 40 years ago, Porębski supplemented them with a short sentence that any answer to the question posed would be premature.⁶⁵ Twenty-five years after Poland having regained independence, in a situation of virtually unlimited possibilities of artistic experimentation, but also at a time of threats of technological development and advanced research, new creative practices are often pursued within teams made up of artists, engineers, scientists, representatives of the social sciences and the humanities. They are one of the major spaces of forging a critical reflection for the social debate on the real impact of science in different spheres of life. Modernity is marked by permanent technological and scientific breakthroughs which redefine contemporary cognitive paradigms. Their changes and progress are so fast that we are unable to valorise or classify them, or to evaluate their possible social applicability. *Art&science* is therefore a vital space for contemporary artistic practices. Art, entering multiple and multifaceted relations with technological tools and scientific research, is a zone of distance and critical reflection on today's acceleration.

⁶² Porębski, *Ikonosfera...*, p. 229.

⁶³ Ibid.

⁶⁴ Ibid., p. 230.

⁶⁵ Ibid.

Work on tactical media, bio art and nano art, the entire broad culture of hacktivism, net art and many other phenomena developing today, stem from the need to redefine scientific knowledge and make it socially available. Art, which responsibly uses scientific cognitive strategies, transforms them and enters into a dialogue with them. Today it is gaining special significance as a space of mediation and negotiation between society and closed systems of transmission of scientific data. Therefore, it is important for creative endeavours to reclaim and "hack" knowledge from the closed circuit of laboratories. Thus, such art addresses ethical problems and poses questions regarding the progress of the discourse of social responsibility with respect to the technological and biological openness of today's human being.



Analog computer AKAT-1 designed by Jacek Karpiński, 1959



Minotaur, Przemysław Jasielski, The Sculpture Center, Cleveland, 2014

The WRO Festival and the beginnings of the digital breakthrough in Poland

Over 20 years ago a new media artist and author of experimental films – a contemporary art icon – Lynn Hershman, vividly presented a breakthrough which took place in her oeuvre as a result of the onset of the computer era during her meeting with the audience at the WRO 93 Festival. When referring to the main epochs in human history she also divided her artistic output into two eras, i.e. works which were created in BC times and AD times. She developed the abbreviation BC for *Before Computers* and AD for *After Digital*, with which she emphasised that the shift of communication and artistic tools from analogue to digital ones was of primary importance to both her own artistic output and to contemporary culture.

In the case of Hershman, who works in the USA, this analogue/digital breakthrough started in the early 1980s when she was working on her *Lorna* installation – the first interactive video narration in which the fate of the main character depended on the choices of the audience. The woman suffered from agoraphobia, did not leave her room and was destined to passively watch television. But Hershman opened up new fields of activity before the viewers. In this installation she replaced a typical video carrier, i.e. the magnetic tape, which was an electronic carrier but still a linear one, with a laser visual disc, thus opening up the possibility of creating variations to the story – something which had been unattainable until then. Thanks to this change, viewers had the opportunity to influence the course of the narration by making choices themselves; their own activity led *Lorna* to one of several possible endings for her story. Thus, due to its variability, the story ceased to be a film, the narration dropped its linear character and the audience was no longer only receptive. This work symbolically contrasted two types of narrative structures and hence two types of viewers, i.e. ones typical of the BC era, dependent on the speaker and his or her traditional narrations, and new viewers typical of the digital era, feeling the need to participate in the change of existing narrative structures and attempting to influence the creation of the artistic work in an active manner. Lynn Hershman's artistic oeuvre is an example of the influence exerted by visual artists, the so-called *first adopters*, i.e. the first users of emerging technologies who experimented with electronic media since the

mid-1960s, on the development of new fields of art. They had an enormous impact on arousing cultural interest in the possibilities opened up by the new media and also, which is very important, on shaping new avenues of technological development. Radical artistic circles experimenting with electronics in the sphere of the image began circulating works and ideas, and to a great extent depended on institutions of the established world of art, in which they took off effectively. Even in highly developed countries back in the late 1980s, electronic art developed beyond the artistic and cultural mainstream. Simultaneously, the process of its gradual stepping out of alternative circles started in the early 1980s. The ideas and initiatives deriving from this circulation had increasingly more influence on how views of that period developed. The date of *Lorna's* release coincided with other changes brought about by new technologies. In the very year of 1984, the marketing and commercial success of the Apple computer took place. It launched the age of personal computers, which was one of the fundamental events among technical, social and cultural processes leading to the present digital breakthrough. In those days, when the first symptoms of a digital breakthrough were taking place in the Western world, a vital role was played by festivals and artistic events presenting electronic art and its new, albeit only potential, relations with society and culture. Edward A. Shanken thinks that

... the important exhibitions and symposia presenting new art which appeared all over Europe in the 1980s, such as: Ars Electronica in Linz (annually since 1979), [exhibitions] Electra (1983) and Les Immateriaux (1985) in Paris, the Biennale in Venice (1986), V2 Organisation - Manifestation for Unstable Media ('s-Hertogenbosch, Holland 1986-1992); the ISEA International Symposium of Electronic Art (Utrecht 1988, with subsequent editions in other countries), and the WRO Media Art Biennale (Wrocław, Poland, since 1989), were a visible sign of the fact that electronic media had left the underground. These events played a major role in developing an international society linked by common interests from the mixed spheres of art, science and engineering, and shaped a practical, theoretical and institutional basis for what later became known as media art.¹

The role played by emerging manifestations of media art in the 1980s and early 1990s was similarly described by Christine van Aasche, a long-standing curator of the media department at Centre Georges Pompidou in Paris, who just as Shanken puts the WRO on the list of the most important festivals integrating artistic circles and presenting a wider picture of what was going on in media creation at a given moment. She also mentions such events as VideoFest in Berlin (from 1988, since 2002 known as Transmediale), the World Wide Video Festival (the first edition took place in the Hague in 1982 and the last in Amsterdam in 2004), and Videonale Bonn (since 1984).² The list should be extended by adding more events, such as: VIPER – Video and Performance Festival in Lucerne (since 1980, the last edition was in Basel in 2004), International Audio-Visual Experimental Festi-

¹ Edward A. Shanken, *Art and Electronic Media*, London–New York 2009, p. 49.

² Christine van Aasche, "On The Aesthetics And Museology of The New Media," in *Objekt: Video*, ed. by G. Hattinger, Linz 1996, pp. 19–20.

val in Arnhem (1985-1995), European Media Art Festival in Osnabrück (annually since 1988) and Multimediale in Karlsruhe (1989-1997). These were the most important periodic events which took place in 1979-1989. And although the list is far from being complete, it accurately illustrates the dynamics of that decade, which was extremely important to media art development. These events also marked the onset of a wider social influence of media art.³ It could be stated that festivals such as these allowed the artists' competences to meet viewers' aspirations.

In 1989 a festival of audiovisual electronic art appeared in Poland, i.e. WRO – Sound Basis Visual Art Festival. It was the first significant manifestation of new media art which appeared in Eastern Europe, at that time undergoing a period of political transformation. At the turn of the 1990s the use of the synergic potential of creating an audiovisual form was one of the fundamental hallmarks of electronic art.

In this article I will focus on the first three editions in 1989, 1990 and 1991. Early WRO festivals presented relatively new media art, which was unknown in Poland at that time, and catered to various groups of recipients. This resulted in arousing wider interest in electronic art and its impact on the development of civilisation in Poland. An equally important effect of the WRO was consolidating the circles creating video and computer art which emerged in Poland in those days, as they had been scattered and were not familiar with one another. They gained a regular audience to present their works and also a venue for meetings and networking. The programme of the festivals was created on the basis of international contacts, sometimes direct ones, but mostly those maintained by mail. These were used to disseminate information and invitations to send in applications. The festival agenda was created mostly on the basis of a list of applications which had arrived from all over the world. WRO 89 presented all of the video works that had been entered. There were over 200 of these and about 1/3 came from Polish artists. Such huge participation of Polish artists was a certain surprise at that time, but it confirmed that, despite the lack of means and regular contact with the world at the end of the 1980s, some new circles had nevertheless appeared in Poland. These artists were interested in video creation and computer art, although they had not had any opportunity to manifest their existence earlier.

Since its first edition, the WRO Festival had a more strictly scheduled agenda. Besides video works (videotaped works dominated among the new media at that time), there were also various kinds of installations and performances. And so in the curatorial part the WRO 89 agenda included videos prepared by Centre Georges Pompidou, the Art Museum in Łódź, Ars Electronica, Het Apollohuis from Eindhoven, Józef Robakowski, Wojciech Bruszewski and the Yach-Film Group of Michael Scroggins (USA). One of the audiovisual activities was a performance prepared by Paul Panhausen and *Romantica for Two Computers* created by Wojciech Bruszewski, a composition using a computer as an interactive

³ To read more on new media festivals, see: Piotr Krajewski, "An Inventory of Media Art Festivals," in *Data Browser 03 - Curating Immateriality: The Work Of The Curator In The Age Of Network Systems*, ed. by J. Krysa, 2006; electronic edition: <http://www.data-browser.net/03/> [accessed: 3 November 2014], pp. 223–235.

generator of music and a speech synthesiser activated in real time. Bulat Galejev presented his invention in action by creating live abstract light animations. The invention involved an analogue generator of optical visual effects constructed under the supervision of the legendary inventor and composer Léon Theremin (Theremin, although he was over 90 years old, was still banned from leaving the USSR. The ban had been issued in the 1930s). The main part of the festival was held for a week in the Black Hall of Jerzy Grotowski's Laboratory Theatre, now no longer existent, in which shows and performances which required electronic equipment were displayed on a video screen (one of the only two available in Poland in those days). Video workshops were organised in the Feature Films Studio, whereas in the "no title" Gallery (currently the City Gallery) there were workshops for computer image processing accompanied by an exhibition of works by László Kiss and Tamás Waliczky (the then laureate of the Ars Electronica Festival); a collection of works from Józef Robakowski's Gallery of Exchange was shown at the Entropy Gallery. Many events took place only in occasionally accessible venues. *Cucumber Road Opera* produced by the Kormorany Group in a deserted and devastated industrial space in a former water tower called Na Grobli became a legend. In the display windows of Monopol Hotel there was a wall of monitors showing video art to passers-by. In addition, a small catalogue including a list of the works and the activities shown was issued. This review of media art and interdisciplinary activities that were precursory in Poland was prepared on a low budget, independently from official cultural institutions and censorship, which was still very effective at that time. It was organised by Open Studio, an independent cooperative created by Violetta Kutlubasis-Krajewska, Piotr Krajewski, Zbigniew Kupisz and Lech Janerka. WRO 89 drew attention to the phenomenon of electronic art, which announced the advent of changes in culture and civilisation. The pioneering formula of the festival, based on presenting art which combined image and sound and was created by using electronics, turned out to be artistically apt and attractive to diverse audiences and also efficient in triggering discourse on the transformations taking place in contemporary art. Therefore, the WRO, i.e. the first festival in Poland which presented this new phenomenon, was thoroughly discussed in the news and received a large amount of press coverage. The video work titled *Ménagerie* by Cécile Babiolle from France was successful in the media, as it was awarded first prize by the international WRO 89 jury and was often broadcast on many television channels.

Also, the international range of WRO 89 was significant. Thanks to it, Polish video art programmes were presented in festivals in such countries as France, Brazil, Germany and Denmark. Young artists were granted the opportunity to participate in shows and workshops abroad. Almost directly after WRO 89 ended, the most interesting works from the festival's programme started to appear at shows organised by Open Studio in Poland; the first such show was held upon the invitation of Urszula Czartoryska at the Art Museum in Łódź.

The next festival took place in December 1990 and adopted an agenda which involved presenting the latest sound and visual output by using the creative potential of the new

media. The National Museum and the Museum of Architecture were the main venues for the festival's activities. Interactive installations devoted to interacting with the audience appeared on display for the first time in Poland. These were created by, e.g. Jonathan Lister Morris and Wojciech Bruszewski. The programme also included such highlights as the performances of Takahiko Iimura (an icon of Japanese video known for taking part in the Fluxus movement and the like), the computer audiovisual activities of the composer Mesías Maiguashca (Ecuador/Germany) who developed the idea of sound fractals, and Maciej Walczak, who improvised graphic structures generated on the basis of his own software. This visual and music activity was presented by the following artists: the Light Open Society collective from Łódź together with the Kormorany Group, Piotr Bikont with Krzysztof Knittel, the Genetic Drugs Group from Berlin and many others. Almost 50 works chosen from 300 applications entered the competition. The main prize was awarded to an experimental political video documentary titled *De la Mano* by Stefan Decostere from Belgium. Also, works awarded at many other festivals were presented, namely those from World Wide Video, Videobrasil and European Media Art Festival. Special shows featured such works as film visual abstractions, early computer films from the collection of the California Institute of the Arts and video programmes prepared by the following institutions: Centre Georges Pompidou, Montevideo/Time Based Arts in Amsterdam and Stop TV and Subversive Media in Copenhagen.

The ceremony of closing WRO 90 with an exhibition of the awarded works accompanied by audiovisual performances and concerts was held in the Wrocław Philharmonic Hall. This event, similarly to the exhibitions presented at both museums, attracted crowds, mainly of the alternative type that had not been seen in those venues before, which was widely covered in the press. Even the fashion column in the weekend issue of a local newspaper published a review of the outfits worn by members of the WRO audience. The first workshops in Poland in graphic art and computer animation that took place in the BWA Small Parlor (now the BWA Design Gallery) constituted a very important and prominent part of WRO 90. In the afternoon after the workshops and when the gallery was opened to the public, visitors lined up along the street in front of the entrance. In the gallery itself one could admire not only artists working on graphic prints or animations and their works in the making, but also graphic stations and powerful computers delivered from Berlin which were not available in Poland at that time. The festival's agenda was issued in the form of a computer printout of several dozen pages.

WRO 91, the last of the pioneering December WRO festivals, was opened with an exhibition of video installations at the National Museum. The installation of Zbigniew Libera titled *Persewercja mistyczna/Mystical Perseverance*, shown for the first time in Poland in the museum context, was one of the most widely discussed works. At the exhibition it was explicitly contrasted with the television sculpture *Tellus Digitalis* by Peter Svedberg (Sweden). The Magic of the Mirror, an exhibition prepared by Józef Robakowski, was presented at the City Gallery. As in previous years, WRO's agenda included a wide variety of video works and a wide collection of works of Polish artists, such as Jan Brzuszek, Witosław

Czerwonka, Robert Jurkowski, Małgorzata Kazmierczak, Mirosław E. Koch, Barbara Konopka, Malga Kubiak, Yach Paszkiewicz, Adam Rzepecki, as well as Grzegorz Zygier, Krzysztof Skarbek, Marek Wasilewski, Piotr Wyrzykowski and Wojciech Zamiara. The international jury gave the first prize in the category of video works to Volker Schreiner from Germany for his work *Bright Box*. Daily broadcasts from WRO 91 were transmitted by Channel TVP 2; one of them was live streaming of a programme devoted to electronic art involving a competition for the best computer animation sent in by viewers. Over five thousand postcards came in from all over Poland (there were no text messages or email at that time and a TV competition was a novelty). An Apple Classic computer was the prize for the audience. For the first time the international symposium became a part of WRO. It was devoted to the then current topic, namely *Video Art – television or independence*, which discussed the peculiarity of video art that in many countries was suspended between independent circulation and commonly available television. The symposium was accompanied by a show of video works by American artists, prepared by the Video Data Bank from the Art Institute of Chicago.

In the years 1989-1991 the festivals as described above started the history of the WRO Media Art Biennale, whose subsequent editions, from 1993 on, increasingly combined a review of the latest modern art with general cultural critical reflection. Now, when most social behaviour patterns and cultural spheres, both present and former, circulate in digital form around the communication network and are available on the computer and/or on digital communication devices and also mediated by various interfaces, it is certainly worth making a systematic historical compilation of phenomena occurring at the beginning of the digital breakthrough in Poland.

Electronic art recently celebrated its 50th anniversary, whereas the history of the WRO Biennale dates back 25 years. In those days the biennale developed into one of the largest exhibitions of media art in Europe. Last year's edition, WRO 2013 Pioneering Values, was presented in 18 venues, lasted for over two months and gathered an audience of well over 100,000 viewers. In 2008 also the WRO Art Center came into existence. It conducts its autonomic activity independently of the WRO Biennale, such as maintaining a constant showroom, publishing, keeping archives, doing research, implementing and holding workshops on a regular basis. These different activities are connected with one another in various projects and are also correlated with the general mission of WRO, which is the mediation of modern art.

Ukryta Dekada/Hidden Decade is an example of such a multifaceted activity. This is a long-term curatorial, research, editing and showroom project aiming at collecting, preparing and rendering publicly available the works of Polish artists created by using video and the first digital techniques during a period which was very special for Poland, namely the years 1985-1995. The WRO Art Center gathered a collection of over 400 video materi-

als from that time and started exhibiting them in the media reading room. Then, during the period of 2009-2011, several large exhibitions were organised under the banner of Hidden Decade, such as an exhibition at the National Museum in Wrocław or in the Art Bunker in Kraków, and an array of presentations and lectures in different countries. The next stage of publicising this project was a book containing critical texts and a set of DVDs with a selection of several dozen works. Such versatile activity helped to reunite this non-described yet crucial period for the development of Polish art with Polish contemporary art history, at least to some extent. It is one of the up-to-twenty projects currently being run by the WRO Art Center as regards preparing the art history of new media.



Krzysztof Skarbek and Poławiacze Peret z Odry, WRO Festival, Wrocław, 1991



Multimedia concert, WRO Festival, Wrocław Philharmonic Hall, 1991



Zabawa z matką (*Playing with mother*), Zbigniew Libera, WRO Festival, National Museum in Wrocław, 1991

RE-MEDIATIONS: LITERATURE, VISUAL AND PERFORMANCE ARTS

Mariusz Pisarski

Programmable presence: Digital literature in Poland 1996–2012

Ryszard K. Przybylski

The impact of the new media on old art disciplines

Anna R. Burzyńska

The real and the unreal. The media in the theatre of Krzysztof Garbaczewski and Wojtek Ziemilski

Magdalena Zamorska

Technology in creative practice and the performances of Polish contemporary dance artists

Rafał Ilnicki

Polish computer games of the 1990s: The chao-aesthetisation perspective

RESUME

PERSONAL DATA

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START DATE

END DATE

REASON FOR LEAVING

REFERENCES

CONTACT PERSON

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CONTACT E-MAIL

Programmable presence: Digital literature in Poland 1996–2012

If the role of the media consists in the transmission and dissemination of the dominant ideology, then the new, digital media – especially the Internet – reversed this role by nearly 180 degrees. This was something more than a “revenge of the word over television,” so proudly indicated by Michael Joyce, the author of the first and one of the best hypertext novels. Connected within a global, non-hierarchical, rhizomatic network, computers have given voice to individuals, each of whom, on condition of acquiring relatively easily accessible competences and earmarking annually decreasing financial outlays, might transform from a passive recipient of media content into its active sender. Wiktor Cuk, a virtual candidate in the presidential elections, was the Polish symbol of a breakthrough; her 2000 campaign was run by a group of Gdańsk-based artists in such Polish galleries as, e.g. Łażnia and Zachęta.¹ Combining fun and humour in the spirit of TotArt with bitter social critique, their artistic and political tour was a representative example of the potential of the new media.

It would not be an exaggeration to assume that only a few years after the breakthrough in 1989 did Polish art and literature begin to experience a different kind of transformation, one that was relatively distant from those in the past history of art movements, i.e. a breakthrough in the field of communications and technology. Although it is virtually impossible to pin it down to a particular event or date, since it was evolutionary in nature, the breakthrough may seem as important as the political transformations after 1989. After all, it led to a permanent reevaluation of the fundamental literary and artistic categories, such as that of the author, reading and the reader, while an understanding of such generic terms as epic and poetry, and the unquestionable and canonical carrier of the book, were questioned and drastically extended.

The growing popularity of personal computers, the emergence of the Internet, mass production of digital portable devices, and the widespread accessibility of digital (static and moveable) image processing technologies and digitally-assisted printing resulted in

¹ Footage of the action can still be accessed online, <http://cukt.art.pl/wiktoria/media.html> [accessed: 17 May 2013].

incorporating these, initially alternative, production and dissemination systems into artistic practice. However, in this article I wish to stay clear of technological determinism, or of the description of literary phenomena as a result of particular tangible and material transformations. The trends, phenomena and works I am going to address first of all draw attention to the artistic intention which is prior to its concrete material realisation, which in this case will move most often towards the digital carrier and the digital, social networking mode of the work's dissemination. It seems that at least half of the artists today who are associated with digital literature, especially its pioneers, originate from such pre-digital artistic traditions and practices as concrete and audio poetry (Tomasz Wilmański), the art book (Radosław Nowakowski), poetic performance (Wojciech Bruszewski), and visual poetry (Małgorzata Dawidek Gryglicka, Robert Szczerbowski). Furthermore, the use of digital technologies is oftentimes one of the many and varied comprehensive artistic pursuits characteristic of the late print age, when the book and the very idea of a text written on paper fail to correspond to the description of a given author's vision (Zenon Fajfer), or, more generally, to the reality of the threshold of the 21st century, in which alternative media help to pursue the total book, which has fuller expressive potential.

Unlike the pioneers, the new players on the literary field, making use of the digital media and distributing their work online, embrace the new media for the purpose of self-aggrandizement and to exemplify their practice. Hence the manifestoes and short, commemorative programme texts. Characteristic of Polish digital literature is, moreover, the synergic and peaceful coexistence of analogue and digital practices. There are no clear-cut boundaries and abrupt ruptures – painting exhibitions in brick-and-mortar galleries and printed poetry exist side by side virtual galleries and an exclusively digital presence of a given work.²

Technological advances come to Poland significantly delayed, 10 years after developing in, say, the US and the UK. Suffice it to look at the dates of origin of the first hypertext novels: 1989 in the USA (Michael Joyce's *afternoon. a story*) and 2001 in Poland (the first parts of Radosław Nowakowski's *Koniec świata według Emyryka*). As a consequence, the history of digital literature in Poland will differ from that in the West. A marked shift and appearance of major examples of digital literature is taking place at a moment when Anglo-Saxon digital literature is undergoing its second phase, i.e. when poetry, expanded and assuming a poly-medial character, is the focus of literary experiments. In the West the stage of experimentation with purely narrative forms, or hypertextual prose based on the node-link formula, is considered a thing of the past (concluded, let us be frank, with dubious success³). Therefore, Polish literary practice sloppily relates to the established and

² More on the history of Polish digital literature see: Urszula Pawlicka, *Polska poezja cybernetyczna. Konteksty i charakterystyka*, Kraków 2012; Mariusz Pisarski, "Dumni, sprytni, goli. Literatura cyfrowa w Polsce 1996-2012," in *Kultura niezależna w Polsce*, ed. by P. Marecki, Kraków 2012.

³ On successive generations of digital literature see e.g. Catherine N. Hayles, "Literatura Elektroniczna. Czym jest?," *Techsty* [online], no. 7, 2011, available from: http://www.techsty.art.pl/magazyn/magazyn7/literatura_elektroniczna_czym_jest_1.html [accessed: 18 May 2013].

fresh tradition of experimenting with words on a computer screen, and because of these relations it is probably more critically self-conscious.

Endeavouring to stay as close as possible to concrete examples, I will present in this article the main manifestoes of Polish digital literature, the principal strategies it has applied to eke out room for itself in the established and developed Polish contemporary literature, the basic ways of redefining the ingrained, traditional paradigms, and the major accomplishments of Polish digital literature within the main and commonly accepted generic categories of electronic literature.

Artistic manifestoes 1997-2006

The egalitarian and democratic character of the Internet and its potential as a platform for communications and an artistic palette was quickly recognised in the Polish Internet. In 1997, Henryk Gajewski, a Polish painter and graphic artist living in the Netherlands, put forth the following demands of digital art:

The artist of the Internet is soul and brain. A poetic sensitivity to the world is not enough; a painter's feel for light, colour and form is not enough; a sculptor's patience or linguistic prowess of the literati and succinctness of copywriters does not suffice, either. An Internet artist must moreover be able to think structurally, in new languages, much the way a computer programmer does. The artist of the Internet is the one who can afford a spontaneous artistic gesture formulated in the hard language of computer programming. Well, I guess Leonardo da Vinci would not cope with all that today! In order to be active as an artist online you do not need to be a genius or be well-connected. It is enough to have free will, ideas and access to information. It is best to kick off by participating in all kinds of artistic projects.⁴

Gajewski, delineating a clear-cut borderline between the art of the Internet and art on the Internet, foreshadows his own time. Most artists – at least for the time being – will treat the global net not so much as a means of expression but rather as an additional, more and more vogueish venue to present their practice and as a platform joining individuals with shared interests. The online gallery of *Mózg Club*, with examples of early Polish net art or the aforementioned *Atlas kraju MOŁR* by Wojciech Kucharczyk, was an exception. Rare were programme statements encouraging artists to get involved in creating fundamentally digital work, arising from thinking in terms of and with the use of the computer. An online poetry service, in operation since 2003, with the telling name of *Nieszufłada (Non-drawer)*, whose intention was to present online poems to be published in print, although it contributed to creating a community of authors and within a few years rose to the status of a portal of opinion and a place where young poets might have their work published or even can debut, did not have a clear programme and by definition could not

⁴ See <http://cis.art.pl/PODWORKO/TEXTY/PUBLIKACJE/INETART/textA.html> [accessed: 12 November 2013].

create one. After all, the very name, albeit ironic, indicates that the underlying objective is to present poems either written to be put in a drawer or implies that they have actually been rejected by traditional publishing platforms.

The "Liternet" conference held in Krakow in 2002 was a clear impulse for self-awareness of the community. It gathered authors, critics and creators of periodicals, online platforms and literary blogs from across Poland ("Meble," "Ha!art," "Techsty," "Nieszufłada," Marta Klimowicz, Mirosław Filiciak). The conference was continued in 2003 and the conference proceedings were published. The Internet as a platform of communications and a tool of expression became the natural ally of new literary groups, a new policy of authors and new methodological trends. Within the next three years, circles emerged which began to distinctly oppose the status quo. The first issue of "Techsty" in 2003 published a mini-manifesto which stated, among others:

In a situation when the entire country has for over a decade been fascinated by the same authors, which write the same novels at regular intervals and gather the same applause in front of TV cameras during barmy events in congress halls, any revivifying breeze must call for approval and bring hope for change in our post-literary reality in any fresh mind ... One of the ways out is to apply a new genre which uses a contemporary language, i.e. hypermedia and the hypertext ... "Techsty" will be interested in any linguistic and para-linguistic, post-literary project which is aware of its media zone, which makes it its artistic medium and which knows its target audience.⁵

The question of post-literariness, i.e. a set of creative practices where the word shifts from the central position and becomes equal to other elements, be it visual, audio and ludic (operational), and encouraged by the polymedia ecosystem of the computer, is expressed not so much in *Techsty*, which publishes mainly new media text-centred literature (hypertextual prose and poetry), but, first of all, in a wide array of informal interdisciplinary actions, and then in a programmatic, clearly specified and strongly redefined generic name.

The first case is the so-called Warsaw Internet Stage (*Warszawska Scena Internetowa*). This name covers a series of diverse artistic practices, from online comic strips to net art, authors' blogs, and small, polymedia narratives published online between 2003–2006 by Warsaw-based authors, such as Michał Kaczyński (pesto.art.pl), Agata Endo Nowicka (ko-mix.glog.pl), Radosław Tereszczuk (Twożywo group, darta.art.pl, twozywo.art.pl), Enekek (nnk.art.pl), and Agata Raczyńska (agatka.art.pl). These Warsaw authors, who shared neither strategies nor media of expression, had one thing in common – recognition of the Internet as a full-fledged medium for publication and self-determination of a generation and a group. This proved to be insufficient – without a common programme and shared artistic goals Warsaw Internet Stage did not stand the test of time as a recognisable group of artists and only some of the above websites, once inseparable, are active today.

⁵ http://www.techsty.art.pl/magazyn/manifest_txt.html [accessed: 12 September 2013].

The second case is Roman Bromboszcz, the Perfokarta group he founded and the “Manifesto of Cyber Poetry” he created in collaboration with Łukasz Podgórn, Marek Florek and Szczepan Kopyt. The cyber poets, as this is the name applied by the authors when they address the public, promote their art writing as follows in the manifesto:

Let us address writing/reading as a communication process where the writer/reader communicates with him or herself, and only later with others. Instead of perceiving the body in the poem, let us try to see an automaton in it. Instead of approving language, let us try to disprove it. Instead of describing – let us try to change ...⁶

In the realm of poetry, cybernetics may construct new tools and help control the creative process. It is vital for it to thematise the questions of power and scope of influence of the electronic media on the human body, its intelligence and axiology.

The “Manifesto of Cyber Poetry” signals a systematic “reconstruction” of word matter, a destruction of syntax and grammar, applying, or rather re-applying, “abstract syntagms” [wywiad, rysztoł, <http://www.rysztoł.pl/index.php/njusy/njusyview/action/view/frmNjusID/210/>]. Making use of cybernetics as a creative source of inspiration, of programming a poem, and as a poetic noise generator proved to be a fortunate and effective programme move. It corresponds to both the postulates of programming art as put forth by Gajewski and to the diagnosis of post-literariness as pointed out by *Techsty*. At the same time, emphasis of the technocentric, constructionist and formalist aspect links the practice of cyber poets with the tradition of pre-war avant-gardes, in particular of Polish Futurism – a permanent source of reference for both the practice of individual authors and for the critical evaluations of their work. Moreover, the authors of the manifesto are sending a clear signal to the Polish literary public – that the new media become tools of the new art, as a result of which poetry morphs into poly-poetry; the word gives way to image and sound and reading changes into construction. This is what Bromboszcz has to say about poly-poetry in a theoretical essay:

Poly-poetry is a neologism necessary to define existing relations and empirically evident processes. Poly-poetry is a wide creative perspective. Outside of what is usually put inside poetry volumes. Poly-poetry makes use of what transcends the book (still images, motion picture, sound, interactivity).

Poly-poetry does not negate literature. It makes use of it, anchoring itself within and outside of its language. Dismantling this opposition, it uses such features of the new media as: space, time, feedback. Outside poetry these features are reduced to the backdrop of perceived sensations.⁷

⁶ See <http://szafranchinche.ovh.org/teor/manifest.html> [accessed: 12 November 2013].

⁷ Roman Bromboszcz, “Polipoezja, cyberpoezja, performance, rozm. M. Pisarski,” *Techsty*, no. 5, 2008, available from: http://techsty.art.pl/magazyn/magazyn5/rozmowy/bromboszcz_rozmowa.html [accessed: 18 May 2013].

From this “medium-sensitive” perspective, a term which was used by Katherine N. Hayles, once again are stressed the features that differentiate the literature of the new media from that of the old media, which in the late Gutenberg era, juxtaposed with the former, demonstrate the deficiencies of such conventional and book-related forms of the literary message as linearity, logocentrism and relegating extra-textual elements to the background. Attempts to apply computer algorithms, randomness and generativeness to the creation of poetry and – an equally important move – instilling such strategies in readers and influential poetic circles were a breakthrough novelty which introduced into Polish poetry elements that had previously been nearly nonexistent.⁸ Later on, following many trials and tribulations along the way,⁹ these attempts proved to be successful.

The Art Book, Liberature and E-Literature

Long before the “Manifesto of Cyber Poetry” was written, unrelated authors whose artistic practice assumed the elimination of barriers between the media, e.g. between painting and literature, literature and performance, and between semiotic codes, e.g. between the word and image, tried and explored the potential of the Internet and its endemic forms of expression. Robert Szczerbowski, within his long-term art and linguistic project titled *Æ*, whose fragments came out in print earlier and were displayed in galleries, decided to check the potential of the “self-generation” of the word in the digital medium and in 1996 published a part of his triptych on a floppy disk. The text is read in an Internet search engine and the navigation uses hyperlinks. Apart from the effect of a labyrinth generated by the link network as a reading pattern, the author creatively uses the open formula of a digital publication, free from material conventions and choosing the convention of a discovered manuscript. As a result, the text is published anonymously, and attached to the disk in a box it is only a preface to an appended note by Piotr Rypson:

This is an unprecedented “impersonal and self-creating” computer publication of virtually inexhaustible text combinations: the first hypertext book in the Polish language. If you like medieval logical diagrams, Jorge Louis Borges’s short stories and concrete poetry, OULIPO and Grammatology; if you are after hermeneutics and phenomenology, ancient labyrinths and baroque combinatory poetry; if you derive pleasure from wandering along the infinite bookshelves of a good library, then this is the book for you.¹⁰

⁸ See Józef Żuk Piwkowski, “Księga słów wszystkich,” [online], available from: <http://www.2b.art.pl/index.php?LANG=pl&struct=2> [accessed: 18 May 2013] as well as – on Żuk Piwkowski’s project – Andrzej Pająk, “Modern generators,” *Cybetext Yearbook* [online], 2010, available from: <http://cybetext.hum.jyu.fi/articles/136.pdf> [accessed: 18 May 2013].

⁹ Bromboszcz tried to be present both in the field of literature and art as a full-fledged candidate for a serious player on both fields. This was far from easy. The ideas of cyber poetry, let alone its non-discursive realisations, were initially rejected by both Polish poets, authoritatively represented online by PoeWiki, and the curators of the new media art, such as the Wrocław-based biennale WRO Art.

¹⁰ Piotr Rypson, notes on disk from 1996.

Rypson aptly diagnoses the aspects of the language of the digital media, which see artistic production in this area as a continuation rather than a rupture. The critic who accompanies the first Polish e-literary publication thus encompasses a whole field of tradition whose inclusion by the authors of the digital era should nearly automatically mean an interest in the tools offered by the new media. A personal computer in this perspective, as proved by the authors of the following decade, is a serious ally of each author identifying him or herself with the practice and aesthetics of concrete poetry, possible worlds and the generative and combinatory aspect of language. The realm of digital poetry, prose and literary installations will be consistently filled with work by authors of this provenance, e.g. Radosław Nowakowski has had the experience of experimenting with art books; Małgorzata Gryglicka Dawidek – with concrete and visual poetry, while Wojciech Bruszewski – with experiments within the “old” new media such as the radio, video and the art of early computers. The first author mentioned here admits that his analogue writing, e.g. *Niepisanie świata* or *Hasa Rapasa*, has the features of a hypertext whose formula was taken over in digital form by a later hypertextual novel, *Koniec świata według Emeryka*. Both Nowakowski and Bruszewski are examples of the few authors who used computers in their projects as early as in the 1980s, applying them not only as typewriters but as, in Nowakowski’s words, a *computorium*, or a workshop full of new tools for creating new meanings (see the conversation between Piotr Marecki and Radosław Nowakowski which elaborates on the technique and practical matters, such as the role of computers, printers, selection of fonts and paper). The author of *Ulica Sienkiewicza w Kielcach*, a book which can be unfolded to cover a length of 9 metres and read from different angles, proves to be a source of information which is usually skipped in literary interviews. Therefore, at the advent of the Internet, they were the most predisposed to the role of being authors of the literature of the new media, which Nowakowski clearly differentiates from aspects of promotion and digitalisation, which are commonly attributed to literature on the Internet:

I was thrilled not only by publishing a text online; I wished to take advantage of the opportunities offered by the medium, of its uniqueness. The question of tools arises here, of paramount importance for me ... Only when you get to know the tools can your imagination run wild. ... What my books and *Emeryk* have in common is the incessant attempt to answer the question if the world can be described, and if so, how to do it in the most adequate and comprehensive manner.¹¹

Having a knowledge of tools offered by the Internet resulted in an idea for a novel where “one small event is described via everything around,” i.e. a polyphonic novel about a local legend told by tens of different animate and inanimate narrators. The Internet proved to be an accommodating medium for such a novel, so much so that Nowakowski – perhaps due to the (then underrated) power of the Internet as a publication platform – is recognised today first of all as the author of the greatest Polish hypertext novel.

¹¹ “Rashomon’ do potęgi entej. Z Radosławem Nowakowskim rozmawia Piotr Marecki,” in *Liternet.pl*, ed. by P. Marecki, Kraków 2003, p. 10, 13.

A separate role, consistently developed through a series of programme statements, is played by the practice of Zenon Fajfer, who along with Katarzyna Bazarnik has since the late 1990s been promoting *liberature*, or a literary practice freed from the limitations of a conventionally printed book, dealing not only with language but also with the tangible, material aspect of the book, i.e. a sheet of paper, the shape of the word and sentence, the font, the physical architecture of the book, etc. The practice and theory of liberature was an original, complete critical project consisting in a reevaluation of the literary tradition, a proposal of creating a new literary genre and a set of writing criteria. The latter are defined by Fajfer as follows:

It is the duty (of the writer) to take into account in the creative process the physical appearance of the book and all the related factors, on a par with the text ... The physical aspect of the book should not be a result of established conventions but an autonomous decision of the author, much like the protagonists' peripeties and the selection of a particular word. The material and spiritual side of the literary work, i.e. the book and the text printed in it, should complement each other to create a harmony ... A writer should each time build the space of his or her work anew, and each work should have its own unique structure.¹²

Although on the face of it liberature may have little to do with the new media, e-literature (in particular in the form of hypertext and emanational digital poetry) is a constant reference point for Fajfer's and Bazarnik's theoretical statements, similarly to the art book.¹³ According to Fajfer, liberature, e-literature and the art book, although springing from the same traditions, have dissimilar goals. The first of these is the "art of book writing," which continues to result in serially published literature with its own ISBN; the last one, as Fajfer sees it, is a token of "autonomous visual expression whose form is related to the book," usually resulting in a single, unique work, such as a painting or sculpture.¹⁴ From this angle, liberature and e-literature are a pair interlinked more closely than the art book and liberature; both are autonomous literary practices based on exploring the medium-specific qualities of their respective channels of transmission. For e-literature this channel is the new media, and for liberature it is the book medium in general:

The reasons for the emergence of both hypertext and liberature are to some extent similar. One is exactly the same: disapproval of the traditional, linear model of reading, in large measure determined by the advantages and disadvantages of the digital medium. As a consequence, some

¹² Zenon Fajfer, "Liberatura. Aneks do słownika terminów literackich," in idem, *Liberatura, czyli literatura totalna*, Kraków 2010, p. 24, 25.

¹³ Although Fajfer's *Oka-leczenie* and *21 liter* can be deemed a literary and conceptual offshoot of the art book, i.e. a global phenomenon, Fajfer flatly opposes this and distances himself from the visual side of the art book, focusing in his work mainly on the literal, "letteral" and literary potential of unconventional ways of type-setting, possible not only thanks to the author's interference, but also thanks to new printing technologies.

¹⁴ Zenon Fajfer, "Jak liberatura redefiniuje książkę artystyczną," in idem, *Liberatura, czyli literatura totalna...*, p. 139.

eagerly discarded this medium and moved into the virtual world, while others embraced and modified its characteristic features.¹⁵

Zenon Fajfer's *Ars Poetica* is living proof of the affinities between liberature and e-literature. This is a digital animated poem in the rhythm, manner and convention of Tadeusz Peiper's flourishing poem. The only computer-generated work by the author of *Oka-leczenie*, seen by critics as the inauguration of a new current of e-liberature, while often discussed, has not been continued to date. Both new tendencies in Polish literature share a similar tradition and refer to a similar canon. Characteristic of early critical evaluations of hypertextual literature and liberature is enumerating their founding fathers. According to the authors associated with *Techsty*, as well as according to Bazarnik and Fajfer, and the authors of "proto-hypertexts" (see one of D. Sikora's early texts) or "proto-liberature," these included James Joyce, Jorge Louis Borges, Laurence Stern, Vladimir Nabokov, Julio Cortazar, Raymond Queneau and Marc Saporta. Equally characteristic is appropriation of the above canon by both sides. Joyce and Sterne, and in particular Stephane Mallarmé, whose texts demonstrate the intention to liberate literary expression from the shackles of matter and language, look more convincing as patrons of liberature than of the hypertext; in turn, Nabokov, Cortazar and Saporta, who explore the potential of alternative and parallel storylines and the textual world, seem to be patrons of hypertextual rather than literary practices. The differences, at the level of programme statements, which aimed to set a position within the field of literature, are deliberately omitted.

From Art-Lit to E-Lit. The birth of the "New Media Author"

Following the process of acquiring autonomy from the fields of power and economy, as described by Pierre Bourdieu in *The Rules of Art*,¹⁶ and after writers at a later time competed against the rise of other professions which successfully supplanted literature in the pursuit of truth and in providing an account of it (exact sciences, sociology, journalism), the function of the prophet and the prophetic discourse becomes the most certain lawful form of legitimation for the writer, as claimed by Gisele Sapiro, following Bourdieu.¹⁷ As can be expected, prophesying intensifies especially during breakthrough times, and the technological breakthrough was no exception. The moment that personal computers entered universities and homesteads, writers such as Italo Calvino, Umberto Eco and Robert Coover spoke out about the future of the book, of literature and culture in general. Parallel to those statements, some authors, in full compliance with the prophetic obligations of the

¹⁵ Zenon Fajfer, "Liberatura: hiperksięga w epoce hypertextual," *ibid.*, p. 4.

¹⁶ Pierre Bourdieu, *The Rules of Art. Genesis and Structure of the Literary Field*, transl. by S. Emanuel, California 1996.

¹⁷ Gisele Sapiro, "Forms of politicization in the French literary field," in *After Bourdieu. Influence, Critique, Elaboration*, ed. by D. L. Swartz, V. L. Zolberg, New York 2005, pp. 149–150.

writer, began to take a position within the newly opened space, thus creating literature conditioned by this space and becoming the “writers of the new media.” A case in point here is Michael Joyce, a writer with a well-received book debut, an author of some significant digital works who at the same time – in separate book publications – gives an account of his experience with the new media and maps out the future of the digital culture.¹⁸ In Poland, contrary to those experiences, taking a position in the blossoming field comes from a rather unexpected side, from the polar opposite of “high-brow” literature, namely from street-art, the visual arts, zines, the music scene and the grassroots initiatives of IT experts – all of who made up the widely-construed net art within which a literary statement was one of the many equal means of expression, and by no means the most important one.

Right from the start, the field of Polish digital literature has been fed from many directions, least of all, however, by poets and writers, especially renowned ones. This was particularly acutely felt at the very beginning of the Internet’s popularity in Poland, the reasons being both symbolic and economic. Interestingly, the first “prophetic” statement concerning the importance of transformations taking place is negative and is a far cry from Coover’s enthusiasm and Eco’s favourable approach. The statement comes from the highest authority on the merger of the humanities and the new technologies, namely Stanisław Lem. In his *Bomba megabitowa* (*The Megabyte Bomb*) of 1998 he wrote as follows:

The Internet is a network that comprehends nothing but merely sends information and connects websites with one another, while the globally growing number of “experts,” who want to show their worth, produce the outcomes of their reflections, of at best little value, as “new scientific hypotheses.” Thus the Internet corresponds closely to the sand and mud which moves towards the turbines of large water reservoirs and, were it not for special filtering devices, would clog the turbines up. However, the Internet cannot sort the information seeds, which are rare, from information chaff.¹⁹

The image of a landfill will stick to the Internet for a long time. The absence of hierarchies, egalitarianism and filters – issues raised by Lem – might be a real problem for education but is potentially revivifying for the literary community. In the latter half of the 1990s this did not take place, also due to very mundane, economic reasons. In the early years of the Internet the Polish-language Worldwide Web was roamed by a large number of students coming from technical universities, in particular IT specialists, representatives of library studies or Catholic centres, all of whom were quick to adopt the new media, or art school studios which as a matter of course experimented with any new medium, as well as the Polish Diaspora abroad. Private persons who wanted to use the Internet in 1996 on their own had to lay out around 6,000 zloty for a computer and make relatively expensive

¹⁸ Michael Joyce, *Othermindedness. The Emergence of Network Culture*, Michigan 2000.

¹⁹ Stanisław Lem, “Ryzyko internetu,” in idem, *Bomba megabitowa*, Kraków 1999.

connections via an access number of the Internet provider Telekomunikacja Polska SA.²⁰ As a consequence, few could afford to use the Internet, and these were mainly representatives of a growing number of creative professionals and representatives of the fledgling middle class.²¹ A computer hooked to the Internet was like an expensive typewriter. Thus the very possession of access to the Internet was not tantamount to the promised change of a reader into an author. In order for the recipient to become a sender, he or she had to either feel comfortable with the tools allowing to present content on the screen or else had to collaborate with IT specialists. The market of marketing services which helped writers turn online and tap into the Internet's creative and marketing capacities was nonexistent at that time. As a result, the art of the word in the Internet between the years 1996–2001 shifted from the literati to either IT people with artistic and literary ambitions and competences or to literati and artists with IT competences.²² In the first period of operation of this field, artistic subcultures were the most visible actor. A typical website formula consisted of an online gallery with links to literature, graphics, music, and the websites of other artists, and a zine which, as a related if more capacious formula, was able to contain elements of a periodical, comic strip, links to favourite websites, films, music bands, or even the adverts of webmaster services.²³ E-zine nrg.com.pl presents its contents as follows:

²⁰ 26 groszy for a unit, or 3 minutes of online surfing *via* a modem connection was barely enough to open up a couple of websites.

²¹ The above social profile of the "internauts," as Internet users came to be dubbed, did not truly correspond to the circles of literature recipients. All literary activity in the pioneering era of the Internet was therefore doomed to ill-suit the stylistics and level of "high-brow literature," even in its incarnation when flirting with live speech and with pop culture, as in the work of authors born in the 1960s. Today, when almost everyone uses the Internet irrespective of his or her generation or profession, the term "internaut" has ceased to correspond to reality.

²² Authors so predisposed hovered on the outskirts of the artistic and literary mainstream: they came from zine subcultures (dentro.art.pl), from broadly construed street-art (vlepkas and graffiti are the original context of activity of the nnk.art.pl portal), from purely IT circles (Poznań Supercomputer and Networking Centre, where the first multimedia and online literary adaptation was created) and the circles of those experimenting with the media on the form of the book (Radosław Nowakowski, Robert Szczerbowski). Such a situation theoretically favours the emergence of artistic communities of the Polish Diaspora which have easier access to the Internet. However, barring exceptions (e.g. Gajewski mentioned at the onset), Poles abroad missed this opportunity. The scientific community will soon start to play an increasing role of both curator and promoter of literary phenomena in the new media. Importantly, these will be first of all young and independent scholars (e.g. the "Liternet" conference was organised by "Ha!art" rather than by the Jagiellonian University), active beside or even beyond universities ("Cyberforum" and "Techsty" services). This was the soil giving birth to young criticism accompanying the new media art of the word; it will likewise contribute to the canon of Polish digital literature.

²³ Webmaster services in the form of "responsible webmastering" were offered, e.g. by Radosław Teleszczuk at darta.art.pl: Revolution in contacts. Never before was access to people so easy. More and more people wish to use the Internet, more and more institutions wish to be present online. We help them out. We create websites but only when we are positive about the social benefits to be had <http://web.archive.org/web/20010815175225/http://www.darta.art.pl/utopia/index.html> [accessed: 9 May 2013].

... energy is a natural mixture of texts and pictures, leaves the mind excellently agile and translucent, imparting it with exceptional brilliance. High quality plant components have been used.²⁴

In such a context, literature assumes the form of brief, occasional entries of poetry and visuals with elements of small animations. The entire project is contained at best within a few interlinked bookmarks, although it is most often a single website with graphic elements and minimum interaction. Short texts dominate and even novellas most often become micro-stories. The introduction of links, animation and graphics into objects of the literary category is uncommon, but it is no exception either.²⁵ Radosław Tereszczuk, Michał Kaczyński and Jan Dzban deliberately transcend the purely literary and move closer to the visual arts and film, or to the newly discovered world of online interfaces and functionalities. In an individual gesture of new communications tools, typical of early net art and lit art, Jan Dzban, in a popular correspondence form, replaces the conventional cells of

Kto mnie niepokoi?

Jeszcze raz jesteś ostrzeżony przed wysyłaniem bulszitu!

Daruj se koleś!

Sabżekt:

Mój imejl jest moim adresem:

Przyczyną mojej interwencji jest ochota na:

Walę: psychodeliki opiaty spidy prochy alk owoce lasu

Mistrzem Polski będzie w tym sezonie: LEGIA PANY lech chuje widzew jude cracovia cwele

TERAZ PISZĘ:

Figure 1. Jan Dzban, *Who Bothers Me (Kto mnie niepokoi)* [<http://dentro.art.pl/v1.0/form.html>]

²⁴ <https://web.archive.org/web/20000520004525/http://www.nrg.com.pl/> [accessed: 9 May 2013].

²⁵ The only poem by Marek Maciejewski from the Mózg Club gallery is accompanied by a dynamic picture with a few changing photographs, in which we see a couple leaning on a door and seated on the floor; the animated gif supplements the poem rather intriguingly and very unconventionally. In turn, "Piosenka" by Krzysztof Gruze, published on the same website, took the form of a digitalised manuscript. These kinds of measures, although they do not dominate over the traditional form of poems published online at that time, accounted for around 1/5 of the literary section of Mózg. <http://web.archive.org/web/20011228111205/http://www.mozg.art.pl/matka/gruse-mowi.htm>; <http://web.archive.org/web/20011225171302/http://www.mozg.art.pl/galeria/maciejewski.htm> [accessed: 18 May 2013].

the html user's form by their poetical travesties: "Who bothers me? / Once again you are warned against sending bullshit! / Let go, buddy!" Next to the line with the sentence "The reason for my intervention is my liking of" there is a menu with three alternatives: a) threats, b) venting negative emotions, c) making dough collectively.

Literary activity at this stage – as to style and language – abounds in informalities and colloquial language that is typical of zines. The language of the Internet is the lingo of young people who address others by their first names, as if there was no complete awareness of the power of impact of an online gallery, periodical or just a set of links. The florid titles and subtitles²⁶ often point to the "psychedelic" aspect of a given work, as if the authors – apart from their admiration for hyperreal.org and fascination with mind-altering substances – intuitively sensed a correspondence between the computer-enhanced extension of the space of writing and the chemical expansion of consciousness.²⁷

Formal novelties which endeavoured to incorporate digital means into the poem's semantics determined the innovativeness of e-zines, galleries or authors' websites. On online gallery websites, literature had to compete against music, graphics and advice on the use of hallucinogenic substances; hence the humorous and ironic convention. The Internet here is an extension of gallery activity (Michał Kaczyński, Łukasz Gorczyca and their Raster) and of the zine (Jan Dzban and his Dentre), but enhancement with elements of digital typography, animation and interaction called for new skills, thus zine editors or online gallery curators also had to be webmasters and programmers. Rare were authors such as Radosław Tereszczuk who were conversant with the secrets of programming.²⁸

What is characteristic of websites publishing literature online at that time is the consolidation in one place and in one website of links to sites of friendly artists and favourite websites. This was done for a number of reasons, including technical constraints, since expensive access to the Internet and the slow connections did not allow one to search long for content. The convention of a micro-net where all content is interesting and, in addition, contrary to the information noise of an open network, ordered thematically and alphabetically, becomes at the same time a social tool – it allows a hierarchical ordering of online art resources, the recognition of some authors and the exclusion of others. Having a hyperlink at nnk.art.pl was a major impulse granting a given online activity a higher rank among other art projects on the web. This tactic was tested by Polish net art, but in the case of literary works it quickly showed the arbitrariness of its valorising procedures. The

²⁶ *The First Psycho-physical Epopee from Ursynof* is the title of an online story by Rafał Bujnowski, "Philosophical and Football Magazine for Drug Addicts" is the subtitle of an online version of "Dentre" zine.

²⁷ This line of thinking was promoted shortly before his death by the pope of psychedelic, Timothy Leary, who saw cyberspace as an alternative realisation of his famous motto "turn on, tune in, drop out." Leary's websites, just as hyperreal.org, were exemplary for the late 1990s. An indefatigable American rebel, dying of cancer at home, was toying with the idea of a live online broadcast of the last hours of his life.

²⁸ The artist derived his interest in technologies as an art tool from the field of the so-called demo stage, organising competitions in which the authors of "demos," or series of dynamic introductions to computer games, bragged about their programming skills. See "Moje wizjonerstwo. Z Radosławem Tereszczukiem rozmawia Jarosław Lipszyc," in *Liternet.pl*.

literary offer of portals and art e-zines, both with respect to traditionally measured quality, including the social dimension of a work and with respect to formal and technological innovativeness, played second fiddle to the offer of the visual arts and was unable to retain for long its position as the literature representative for the Internet.

Why did literary works that were scattered across *nnk*, *Mózg* and *Raster* galleries (with the exception of Michał Kaczyński's *Stokłosa*) not become ingrained in the minds of critics and readers of e-literature and did not make it into its emerging canon? First of all, despite the surprising consistency in publishing the "texts" section side by side with graphics, images and music, these were first of all websites created by artists, sometimes by IT specialists, and the literati represented there were those related to zines, i.e. the literary underground outside of traditionally understood "literariness," where the anti-literary, joke and gargantuan elements of language moved to the front in a series of short, hybrid online texts. While works by authors such as Jan Dżban and Michał Kaczyński have retained their value (the former published compilations of his zine and online activity in book form), the occasional, often fragmentary and unfinished works by Wojciech Kucharczyk, Krzysztof Gruze and other authors might find it difficult to go down in the history of e-literature. However, most importantly, the above authors were not intent on making history. As pioneers of free artistic expression at a time of a sudden explosion of a new medium, they were the writers of the new media by accident, on top of their being artists, musicians or the bosom friends of their colleagues who built and maintained their collective presence online. Therefore, the online literature of that time could be called lit-work rather than e-lit, as a calque of art-work, which was the principal and central formula of these authors' online presence. Thus the term "new media author" will be applied to other authors, especially if the "author" is understood here as a member of the literati.

Four sub-fields of the literature of the new media

Around the year 2001/2002 the comparison of the Internet to a landfill began to crumble. The online literary communities that were emerging at that time, gathered around the portal of the telling name *Nieszufłada.pl*, around the forums at *poezja.hum.pl* and *Forum Prozatorskie*, indicate the constructive side of the net. It quickly turns out that simple communications patterns such as tools for running and moderating an online forum or a group of anonymous authors is capable of peer assessment and monitoring of the quality of output to an extent that is rare under analogue conditions. Online comments become the weaponry in this battle for quality. Their numbers and illocutionary force are decisive for a given poem's future, for how long it will occupy the topmost positions of a forum as the most often addressed and read, and for the community trajectory of the comments' author, who may acquire the status of a forum moderator thanks to them.²⁹

²⁹ On an online commentary as a genre; see Igor Stokfiszewski, "krytyka.pl. 19 komentarzy," in *Liternet.pl*, pp. 279–281.

In this community context, those aspiring to the status of an author of the new media are authors who treat the new media as a waiting room for a “bona-fide,” a professional literary life in which there is a contention of beliefs, evaluations and comments on the writing trade. This is a means of acquiring cultural capital and an online bridgehead occupied by a group of authors with a shared goal, such as the publication of a work in a paper-based magazine, publication of a poetry book, or an honourable mention in a literature competition. Igor Stokfiszewski, commenting on the activities of online literary circles, and still from the perspective of the receding paradigm of literary life, ascribed to them a lack of professionalism and censures their high-school level of critical discourse (juggling terms such as “lyrical subject” or “epithet”).³⁰ This situation will continue to dramatically change, as the very appearance on a literary forum is enough to set the self-regulatory patterns in motion. A poet who will swallow a few dozen unprofessional comments might have a better understanding of the pluses and minuses of his or her poetry than after having received an appropriate remark by a single professional. Surprisingly enough, the most important appreciation of online literary activity came at that time not from the young critics represented by Stokfiszewski, but from those connected to the older generations of authors and not related to the Internet scene. Kinga Dunin and Karol Maliszewski enthusiastically received the *php wiersze* anthology published by members of an online discussion forum called pl.hum.poezja. Maliszewski considers this initiative of “introducing poems into the world by a medium” to be a return to the old ways of setting up literary groups, to the correspondent clubs important for the generation of the draft book of the *Radar* periodical which gathered enthusiasts and persons distanced from aesthetic ideologies. The critic is, moreover, acutely sensitive to the beat of the new poetic network:

We can still chatter in a friendly way about a poem, quarrel about it, ridicule it, be surprised by it or identify with its style and message. All of this can be done in a laid-back manner, with no stilted words, old-boyism and double-dealing. You are blunt, but not without finesse ... since there is nothing to lose or gain. Respondents-poets may not even know one another’s faces.³¹

Although the Internet contributes to the emergence of a group, the authors themselves treat book publications as a form of leaving the “Internet ghetto.” A short history of the group presented in the introduction is, as Kinga Dunin phrases it on the cover, a “record of a path from chaos to order.” This form of activity will prove the most readily adopted model of writers’ use of online tools in Poland. Printing articles and books on the basis of a selection of texts on an author’s blog or a series of essays on a literary portal will become a matter of course. However, the “ghettoization” of the Internet will be soon watered down by its growing ubiquity and thus an efficient literary website might easily attract tens of times more readers than a poetry book published in 500 copies.

³⁰ Ibid., p. 279.

³¹ Karol Maliszewski, “Z getta,” in *Liternet.pl*, p. 276.

The objective of the authors from the debating group at pl.hum.poezja was peer assessment, providing advice on writing and, ultimately, book publication. They saw the new medium as a tool of perfected, asynchronic communication. However, on the horizon of creative aspirations in this case were no forms appropriate for the Internet, let alone any intentions of pursuing them (e.g. to demonstrate their generational or ideological uniqueness). From the perspective of the history of the social presence of literature, a reverse phenomenon took place, namely the young p.h.p poets made use of the Internet and cutting-edge technology to perpetuate literary patterns developed through tradition and preferred by older and recognised authors, whose status they themselves aspired to. Still, the online presence of the group was a novelty in Poland and worthy of praise by Maliszewski and Dunin.

The situation with the digital aspirations of recognised writers is slightly different. At the onset of the previous decade, when an average reader could associate the entry "online literature" only with the best-selling novel *Samotność w sieci* (*Loneliness on the Net*) by Janusz Wiśniewski, Krystyna Kofta and Jerzy Pilch put forth two independent initiatives with the use of the Internet. Krystyna Kofta decided to show online excerpts of her novel *Krótką historią Iwony Tramp* (*A Short History of Iwona Tramp*) before its publication in a paper-based form and encouraged readers to make comments and to offer suggestions. The story about a mysterious, rebellious teenage girl was peppered by the writer with perlocutionary signals which opened up the narrative to the readers' interference (e.g. "We do not know what will happen to her;" "Who's going to help me out?," "Are there still disinterested people in the world"). The result was, even if this is difficult to verify, that four sections of the finished novel were written by the readers or written based on their advice. Kofta sums it up as follows:

Older writers are scared of the Internet as the devil is scared of holy water, if not more. Some women writers dabble in it, others are superstitiously awed, like peasants faced with the first steam engine. (Most) editors and critics are likewise scared of the Internet. In other words, the literary community is not after a revolution but opts for the traditional form.³²

Jerzy Pilch was not scared of the Internet; together with the editors of the online version of *Polityka* weekly in the summer of 2002 he led a holiday project called "Write a novel with Pilch." This was an attempt to write an interactive, branching-off romance whose frame and first instalment was written by Pilch and the remaining parts were to be continued by the readers. The plot begins a year after the protagonist has met a girl he did not know before at a railway station and they both promised to meet in the same spot 12 months later. Pilch stops the narration 7 minutes before the appointed hour and encourages readers to send in a continuation of the story. Already after the first wave of proposals (over a thousand of them!), the story began to take on a few alternative paths

³² Quoted after: Marta Cuber, "Internet jako źródło cierpień literatury. O polskiej prozie internetowej (i jednym dramacie)," in *Liternet.pl*, p. 86.

(an angel theme, a pursuit theme) and then followed two main offshoots (the daughter storyline, the Matylda plot). The writer performed the role of a moderator who chose the continuation, took care of the uniformity of style and commented on the progress of the novel in an unmistakable “Pilchesque” style. Still, the layer of irony and humour also hid a cognitive bend in the face of little known generic conventions of interactivity and in care for the coherence of the branching-off story:

Each accepted proposal by definition eliminates the other proposals and I would not like this to happen till the end. The selected beginning implies a rather sensational course of events and this is how it should progress. However, let us not try and give up all of this psychological richness; a few of your ideas, to tell now the story from the point of view of the heroine, seemed pretty smart, if a bit premature. The drama of her consciousness might appear in, say, part seven. But, I repeat, I do not offer any suggestions as to the plot and am simply curious what will happen next; my only hope is that I will not perish under the burden and magnitude of the game.³³

Although for obscure editorial reasons the project was discontinued after the twelfth episode, and although the role of the digital medium was limited to that of a correspondence platform, the project should be seen as one of the defining moments in the history of Polish interactive literature. Its potential had earlier been indicated by Polish avant-garde writers before the war (Jan Brzękowski, *Psychoanalitik w Podróży*), and by avant-garde writers active after the war (Stanisław Czycz in *Arwa*). However, it was fully implemented in popular, especially SF literature, in the form of paragraph games popular in the 1980s (e.g. *Dreszcz* by Jacek Ciesielski). Pilch extended this modest genre with the aspect of authorial collaboration. However, in a media-oriented perspective, an interactive romance in instalments did not bring anything that would be impossible on the radio and on television, where interaction with the public and the formula of co-authorship have been made use of before.³⁴

Krystyna Kofta's and Jerzy Pilch's actions, to some extent pioneering, include elements of the colonisation strategy, consisting in a careful yet well-advertised encroaching onto a new field which is potentially important for literature. However, the components of this area are not used to enhance its own fledgling autonomy but to strengthen the autonomy of the original area, along with its representatives. The effort taken to apply these measures is in line with one's position and the cultural capital gained. In the case of both authors, this is the dominant position (when writing online works they had contracts with major publishing houses). The effort taken in the new area is thus minimal. In other words, in the case of Pilch and Kofta there is no full translation of the new medium into

³³ See “Napisz powieść z Pilchem,” *Czytelnia Onetu* 2001, <http://web.archive.org/web/20030510030458/http://czytelnia.onet.pl/2,1057830,0,1673,rozne.html> [accessed: 18 May 2013].

³⁴ A case in point is *Kinoutomat*, a Czechoslovakian interactive film of 1967, or the programme *Purchawka* by Artur Sosen Klimaszewski and Przemysław Frankowski, broadcast by the Poznań-based Radio Eska in 2000.

literary production: by making use of one of the key paradigms of the digital medium (“interactivity”) the authors tactically and only apparently locate themselves within the digital literature but actually do not reject the paradigms of the printed world. Today, similar measures which make contact between authors and their public more engaging have become commonplace, e.g. many publishing houses treat them as a mandatory element of authors’ websites and the writers’ presence on Facebook, Twitter and other social media.

Thanks to the Internet, the young poets of the *poezja.hum.pl* group were able to set up a literary group and to relate strongly enough to one another also outside the “virtual” community to publish a regular book. Thanks to this book the authors’ aspirations to be recognised and noticed by the “real” literary community were greatly enhanced. The role of the new media in this context seems to be of secondary importance, i.e. where and how a group was created is far less important than the effect in the form of an anthology which in itself, i.e. in the changed conditions, may originate a new life on a literary map. No wonder that the authors of *p.h.p wiersze* did not feel the urge to put forth programme statements which would stress the new media aspects of the group. Such a form of self-determination would have been out of place actually, and at variance with the objectives of the group, whose members wished to be real rather than virtual poets, and this would pigeonhole their work as digital. This model will be implemented in the forthcoming years, to a lesser or greater degree, by dozens of poetry websites and forums. Acclaimed authors such as Kořta and Pilch did not need to programmatically identify themselves with the new media. Their use of the digital tools in single literary projects should be seen as a result of the publisher’s marketing policy and the author’s aspiration in the face of new forms of contact with the public³⁵. The realisation of the para-marketing formula, enhanced by a formal aspect in which the digital element impacts the relation with the reader and the content of the work, is not that frequent, especially in the early stage of the Internet’s popularity. The poet Miłosz Biedrzycki makes available on his website a hypertextual version of his poetry volume *pył/typ (ash/hsa)*. Some of the words in the poems are hyperlinked and thus individual poems are interconnected, and their readers are invited to discover meanings contained in the author’s links. Still, the basic form of the presence of acclaimed writers, apart from publishing biographies and links to bookstores on their websites, will be publishing fragments of their books online, with no changes in the text and with infrequent encouragement of the readers’ comments.

The above strategies comprise a clear type of patterns of behaviour towards the communicative and literary potential of the new media. The digital domain is clearly subordinated to the analogue domain and its characteristic reception conventions, although it does favour new ways of communication between participants of the literary field. On the one hand, we have young and aspiring authors, and, on the other, seasoned and acclaimed

³⁵ In Pilch’s case the entire project was published online after it ceased to come out in the paper-based version of the weekly. *Czytelnia Onetu* only re-published the workshop along with its follow-up content that was exclusive to the online edition.

authors. However, neither group is interested in serious qualitative or quantitative changes with which the new media might impact the development of their literary production. For Jerzy Pilch, a novel written by readers is a literary summertime game; for Biedrzycki the hypertextual *ash/hsa* is a formal attempt, a kind of interactive bonus for the reader and a tentative sounding out of the new, digital backyard. However, just as in the case of *Historia lwony Tramp*, this is a one-off action.

The situation is different at the other extreme of literary interference with the new medium, which is characteristic of the authors discussed in the section dedicated to the history and programme statements of Polish digital literature. This zone is also divided into two groups, separated from each other by a rather flexible generational difference. The first gathers artists who debuted prior to the advent of personal computers and the Internet but who, just as Radosław Nowakowski and Robert Szczerbowski, sought non-traditional means for literary expression in installations, art books, concrete and visual poetry or, like Wojciech Bruszewski and Józef Żuk Piwkowski, experimented with computers as early as in the 1980s. These avant-garde authors, located at the frontier of literature and other forms of expression (i.e. the visual arts, installation and performance) had a special predisposition for projects that tap into the potential of the new media. The result was either Internet incarnations of realisations begun in a different media context (Szczerbowski's digital *AE* concludes a triptych commenced much earlier, while Piwkowski's online *Księga słów wszystkich* of 2000 is the third version of an earlier implementation of this exact idea, the first of which dated back to 1975), or of original "online-born" work such as Radosław Nowakowski's *Liberlandia*. For this group of authors the most significant role of the Internet is the construction of a bridge between identical creative practices in the old and the new medium, thus placing the entire oeuvre in a broader context and promotion of earlier production in a new environment.

The last and most important element of the above set of relations with the debutantes and seasoned authors of traditional literature and artists from the frontier of arts experimenting with digital literature is a group of authors who use the new media as their own creative environment and as a unique array of means of expression. These are poets gathered around the groups Perfokarta and Rozdzielczość Chleba, publishing their digital work on the "Techsty" and "Ha!art" portal (Bromboszcz Podgórni, Onak, Dr Muto, Konrad Polak). Unlike their contemporaries from *poezja.hum.pl* and *nieszufłada.pl*, they do not aspire to be included in the legacy of traditional poets and writers, as writing conventional poetry or prose and being successful in these areas is not their priority. Their horizon of aspirations is determined by the creative work of avant-garde artists who become their patrons and natural allies. In order to be different from them and to emphasise their uniqueness in the literary mainstream, these authors frequently put forth programme statements, the most significant of which, the "Manifesto of Cyber Poetry," whose announcement and promotion took place in a few poetry circles across Poland, fulfilled its role in that the presence of "cyber" authors in young Polish literature was increasingly difficult to ignore.

The relations in the new media literature in Poland are shown in the following graph:

Table 1. Digital literature in Poland: a scheme

	YOUNG GENERATION	OLDER GENERATION
ANALOGUE ZONE	print aspirants	acclaimed writers
DIGITAL ZONE	cyber authors	avant-garde authors
	NO CULTURAL CAPITAL	CULTURAL CAPITAL

Each of the group categories should theoretically be comprehensive enough to encompass diverse and often distant practices. The short history of links between Polish literature and the new media shows, however, that the potential for innovation is lopsided. There are far fewer structural and ideological differences between *nieszufkada.pl*, the website of a poetry group on Facebook and a debating forum about literature in the area with a working name of “print aspirants,” than between Bruszewski’s *Maszyna poetycka* and Nowakowski’s *Koniec świata według Emeryka*. Within the area peopled by cyber authors, the diversity of approaches is still greater. If we were to illustrate this by an understanding of the role of the author as the sender of a message, then the diversity of solutions is actually very wide – from individual projects of a single author with all of the consequences (tools found on the Internet, amateur graphics and typography), through projects signed by the name of a single author yet being in fact the result of team work, much like a film production, as in the case of Aneta Kamińska’s interactive, animated poems, or *Blok* by Sławomir Shuty, through the radically cybernetic solutions of Jarosław Lipszyc and Jonas Gruska. Lipszyc made hundreds of anonymous Wikipedia writers the collective author(s) of his textual assemblage entitled *Mnemotechnics* (2008); some of the authors are in fact bots, or programs that scan online resources. In turn, Jonas Gruska’s *Báseň* (which is a poem in Slovak and Czech and means “swimming pool” in Polish) is a poem generated in real time by the updated contents of the *gazeta.pl* news channel. There are so many artefacts and tendencies in the digital zone that they seriously dwarf the digital projects in the analogue zone, for which the new media are first of all a domain of enhanced communication. The complexity and innovativeness of the latter do not allow, however, to belittle the minimally innovative practices of the authors who perpetuate the analogue zone. Although the writers from the lower left field have programmed their presence in the literature as “new media authors” themselves, the redefinitions within the act of literary communication made by the print zone writers via the Internet are likewise a part of the history of Polish digital literature.



Piotr Krajewski and Lynn Hershman, making an announcement, WRO Festival, Wrocław, 1993



Exhibition in The National Museum in Wrocław, WRO Festival, 1990



WRO exhibition's posters in the Center for Contemporary Art Zamek Ujazdowski in Warszawa, with Jolanta Ciesielska, 1991



Interactive Installation, WRO Festival, Wrocław, 1990



CorelDraw workshops, WRO Festival, Wrocław, 1990

The impact of the new media on old art disciplines

A glance of the eye

To give a comprehensive account of the changes arising from the dissemination of digital technologies is no doubt a tall order. There have been too many of these changes, happening too rapidly and too widely. Hence, each attempt at describing them becomes obsolete virtually the moment it is published. The above notwithstanding, however, the analyses and syntheses meant to systematise the entire phenomenon continue to be written, although we are well aware that a similar ordering is to no avail if we were to, say, put forth opinions about the future. Futurological thinking in this context can be likened to reading tealeaves; either we will manage to foretell the future or not. Everyone, therefore, has his or her own story about the potential offered by digital technology. While some of these approaches become institutionalised and, as a consequence, acquire the status of the dominant narrative in particular circles, this is no longer a grand narrative. The latter has been supplanted by small narratives. It seems that the situation resembles that of vision and its importance to contemporary culture. On the one hand, we are noting an uncontrollable excess of images which almost terrorise the contemporary human being, and, on the other hand, we are observing that the significance of vision is slowly deteriorating along with the dissemination and popularity of the new media. It would be by far simplest if we agreed that both of the above conclusions are true and that, in a word, contradiction is an unavoidable element of the present times. However, what is the result of this conclusion for vision itself? We can say that in the past, quite recently at that, the significance ascribed to it was part of the paradigm founded for an objective perception of reality, i.e. a manner of vision which distanced the object of vision from its perceiving subject, assuming that with the aid of a visual device, such as a *camera obscura*, we could come up with an adequate picture of the world, and that vision integrated the data obtained by the other senses. Such generalising judgments contributed to a belief that it is ocular perception that is capable of creating a model, whose application will prove useful for each form of *episteme*. And actually, the second half of the 20th century or, more precisely, the latter half of the second half of this century, laid bare the inadequacy of such beliefs. This is because the new media,

overcoming the dominance of analogue records, have established entirely new modalities of operation. The zero-one system greatly expanded the possibilities of registering various semiotic systems and, moreover, due to HTML language, made it possible for them to be interconnected in an unprecedented manner. Vision and the perception of the other senses could be interlinked not so much by logical consequence but rather via free associations. This no doubt came closer to how our brain works. Thus, vision broke free from the dominance of historically rooted thinking standards. Or rather, shall we say, vision was unable to catch up with the various modes of looking and became dispersed in them. Each of these modes grew more and more autonomous and no longer fit any common denominator. Instead of vision, therefore, we are dealing with all kinds of practices of visual perception, such as glancing, spying, peeking, peeping, looking, etc. Vision is not above them but is added to them as one more distinguishable practice. After all, we perceive the world not only in line with the convergent perspective or the plane perspective.¹

Perhaps it is precisely due to this dispersal of the practices of vision that these days we are talking about a crisis of vision? Still, this is no doubt also caused by the experience of the new media, which, on the one hand, exposes the associative connectivity of sensory perception and, on the other hand, demonstrates the possibility of interlinking all kinds of files (jpg, mpg, videos, etc.) within one website or in the structure of the hypertext. The monitor display becomes in this optic a field of new explorations. Therefore, when giving an account of digital culture we must not forget that it is invariably accompanied by a glance tainted by a crisis and that, in actuality, this is going to be at best a small narrative. There is no one comprehensive all-encompassing model which would justify opinions offering comprehension at least within the interpretative community, if not in the knowledge society.

The most adequate point of view to be taken in an endeavour as this present one is offered by cultural studies. On the one hand, scholars are intrigued by fields which have to date not been subject to scientific exploration and, on the other hand, we are also dealing with non-academic modes of description which allow many possible, oftentimes outright non-professional research approaches. "A glance of an eye" is, then, doomed to fragmentariness, overt intentionality and, in a way, lack of professionalism. However, if we assume that the vertical order has in contemporary culture been replaced by a horizontal order, or disorder actually, then it is hardly surprising that all kinds of the most bizarre competences may meet in this plan. This is precisely what happens on the Internet.

Digital visual culture

The visual arts very quickly became part of the dynamic process related to the possibilities offered by the tools of digital technologies. After all, exhibitions showing work made with the aid of a computer were organised as early as in the 1960s. A major show in this re-

¹ See Ryszard K. Przybylski, "Kulturowe aspekty widzenia," in *Kulturowe wizualizacje doświadczenia*, ed. by W. Bolecki, A. Dziadek, Warszawa 2010.

spect was *Cybernetic Serendipity*, which was held in the Nash House in London by the Institute of Contemporary Art in 1968.² Its curator, Jasia Reichardt, collected different works (graphics, music and computer animations) linked to electronic or computer art, although the underlying notion here was cybernetics. A press release about the show read as follows:

Cybernetics refers today to systems of communication and control in complex electronic devices like computers, which have very definite similarities with the processes of communication and control in the human nervous system. A cybernetic device responds to stimuli from outside and in turn affects external environment, like a thermostat which responds to the coldness of a room by switching on the heating and thereby altering the temperature. This process is called feedback. Exhibits in the show are either produced with a cybernetic device (computer) or are cybernetic devices in themselves. They react to something in the environment, either human or machine, and in response produce either sound, light or movement.³

In fact, the exhibition was not only to show artistic accomplishments through the use of, e.g. computational devices in the creative process, but also to acclimate viewers to the presence of contemporary technology also in the realm of art. In the 1960s technology was not welcomed in art venues despite, let us add, the experience of the first avant-garde. Still, in modernist aesthetics the process of acclimating oneself to a technological-dominated civilisation was relegated to the backdrop since art itself was to be the object of art.⁴ Heidegger's *The Question Concerning Technology*⁵ resounded in a void, at least with respect to a vast field of artistic experience. Thus art recipients had to acclimate themselves to technology, and in this case computer technology. Today this should come as no surprise even to all those who cannot imagine their lives without a cell phone, tablet or notebook. The abrupt acceleration of the development of digital technologies, and in this particular case also their mass availability, has in fact been a thing of the past two decades. It is therefore clear that the curator of the *Cybernetic Serendipity* show displayed in three sections, respectively, the accomplishments of artists who applied computers in their work, the computers themselves, i.e. computational machines that can be taken advantage of in the implementation of artistic intentions and, last but not least, a history of their coming into being.

Today, a few decades later, we may have the impression that the cybernetic zeal exhibited by Jasia Reichardt has radically waned. This is most likely due to the fact that computers are treated as tools which facilitate a perfected realisation of the various goals which were earlier possible thanks to other instruments. Without a doubt this conviction seemed deeply rooted at a time when the computer was predominantly associated with

² On this topic see: Christiane Paul, *Digital Art*, London 2003, pp. 16–18.

³ <http://cyberneticsserendipity.net/> [accessed: 11 August 2013].

⁴ Arthur C. Danto, *After the End of Art. Contemporary Art and the Pale of History*, New Jersey 1997.

⁵ Martin Heidegger, *The Question Concerning Technology and Other Essays*, transl. by W. Lovitt, London 1982, pp. 3–35.

artificial intelligence and, besides, was located within the Web 1.0 environment. At present, however, when the computer has for most people turned into a communication tool and is in the Web 2.0 era, a similar disdain for cybernetic roots seems out of place (incidentally, it seems worthwhile to note at this point that scholars, at least those dealing with the semiotics of visual messages, did not always forget about cybernetic roots, as was demonstrated, e.g. in the works of Umberto Eco⁶).

The whole issue looks different from the perspective of ANT, or the Actor-Network Theory, which claims that not only humans are capable of taking action. Under this approach it is not the objects that are important but rather the material and semiotic relations between them. The Web. 2.0 environment, therefore, treats the human person and the machine on a par. What is more, the latter acquires the features of a subject. After all, "objects, apart from 'determining' or being a 'horizon of human action' may, as Bruno Latour observes, authorise them, allow them, facilitate them, encourage them, consent to them, suggest them to him, impact on them, stop them, facilitate its performance, prohibit it, etc."⁷

Hence the dependence not only of the machine on the human being but also of the human being on the machine. However, speaking about dependence, one should think first of all about mutual conditioning, correlation and even integrity. In this sense, organisms and devices react similarly, functionally, to external, environmental stimuli, but at the same time they have an impact on it (on the outside). Naturally, this approach fits the cybernetic pattern and thus confirms the intuitions trusted by Jasia Reichardt during the *Cybernetic Serendipity* project. Today we can even speak of the cyborgisation of humans. Machines are no longer tools that are an extension of our senses, which could be defined by Heidegger's notion of a "set," itemised as "additions."⁸ This perspective posits the existence of an additive set to which humans would be added. Obviously, this would mean the degradation and reification of the human being who would thus stop being the guardian of truth. Here one feels the urge to ask where the limits of the human being lie? Are we able today to separate human beings from all kinds of prostheses, implants and additions which allow them to exist in the world? Furthermore, can humans be separated from the many and varied communication technologies which make up virtual worlds, which are incidentally as real as the actual ones? When Hans Belting wrote about the memory of images, about the reservoir that we carry within ourselves, he stressed that the human body is their medium.⁹ Under this perspective we may speak of a radical expansion of this spectrum. Namely, memory is extended by a wealth of images available online. Integrated with the new technologies, the human being contains a huge database. Thus, artificial intelligence becomes also his or her furnishing. Focusing attention on knowledge, Latour

⁶ Umberto Eco, *Nieobecna struktura*, transl. by A. Weinsberg, P. Bravo, Warszawa 1996.

⁷ Bruno Latour, *Splatając na nowo to, co społeczne. Wprowadzenie do teorii aktora-sieci*, transl. by A. Derra, K. Abriszewski, Kraków 2010, p. 101.

⁸ Heidegger, op. cit., p. 35.

⁹ Hans Belting, *Antropologia obrazu, Szkice do nauki o obrazie*, transl. by M. Bryl, Kraków 2007.

wrote in turn that “the information technologies facilitate the investigation of connections of unprecedented width. It is not so much that they change the old concrete ‘human’ society, transforming us into bona fide cyborgs or ‘posthuman’ spirits but rather do something totally opposite, *making apparent* what was present only virtually before.” Competence is at stake here. In the past it remained something mysterious and was therefore addressed holistically, while today it is dissected into bits and each leaves a trace of its origin. As Latour further observes, “whereas information technology was to be a question of all or nothing, it now proves a tentative result of action of the entire set of plugs from totally different places.”¹⁰ The differentiation between the whole and a set is not accidental as in fact the categories are inherently incongruent. The whole presupposes self-sufficiency, while a set assumes dependence.

The Internet is no doubt its best proof, yet in itself it cannot be treated as unique. In fact, it squeezed into the space of human practice and imposed its own mode of operation in other areas of activity. This slightly resembles the situation when new media technologies cause a convergence of previously used media.¹¹ Therefore, too, we can speak in the media-dependent world about the culture of convergence. Undoubtedly, the set referred to before enables or actually enforces greater activity in the way of acquiring and creating information. Here the notion of “information” is inclusive of a set open to its different forms. This applies likewise to art objects. At this point one would like to say that they become located in a novel environment. In Pierre Bourdieu’s terms, one may say they have been dislodged from the field of art and placed in the field of the media.¹² This is a different, or another, form of the phenomenon that was defined already by Walter Benjamin. If a work of art lost its aura in the era of technological reproduction, this was because it was dislodged from its natural context. In effect, it also lost its bond with tradition since it was adapted to the axiological order of the contemporary time when it was reproduced.¹³ Similarly, the field of media is at present – in many people’s opinions – a serious threat to art. It mixes hierarchies and orders. In fact, it strips all artistic practice and, quite naturally, the effects of this practice, of the sacred potential. Thus art, on the one hand, gets dispersed; it is an element of a larger set since the set it makes up loses cohesion and the limits that previously defined it get blurred and fluid.¹⁴ On the other hand, the field of artistic practice is entered by numerous groups of all those who have previously been classified as amateurs.¹⁵

¹⁰ Latour, op. cit., p. 303.

¹¹ See Henry Jenkins, *Kultura konwergencji. Zderzenie starych i nowych mediów*, transl. by M. Bernatowicz, M. Filiciak, Warszawa 2007.

¹² See Pierre Bourdieu, *O telewizji. Panowanie dziennikarstwa*, transl. by K. Sztandar-Sztanderska, A. Ziłkowska, Warszawa 2009.

¹³ Walter Benjamin, “The Work of Art in the Age of its Technological Reproducibility,” in idem, *The Work of Art in the Age of its Technological Reproducibility and Other Writings on Media*, London 2008.

¹⁴ On the fluid aspect of culture see: Zygmunt Bauman, *Kultura w płynnej nowoczesności*, Warszawa 2011; idem, *Płynna nowoczesność*, transl. by T. Kunz, Kraków 2006; idem, *Płynne życie*, transl. by T. Kunz, Kraków 2005.

¹⁵ Andrew Keen, *Kult amatora. Jak internet niszczy kulturę*, transl. by M. Bernatowicz, K. Topolska-Ghariani, Warszawa 2007.

Digital visual culture in Poland

One thing is certain. When speaking about the Internet and the visual culture associated with it we cannot single out a preferred perception. On the contrary, a location in this medium contributes to an evident division of what was previously generally seen as a hegemonic pattern. We are not dealing, then, with many kinds of vision but with one dominating kind. The dissemination of, say, a motion picture and the related ways of perception are offset by others. None, however, has the power and skill to hold power over the others. Instead, they have grown in number. While these ways of vision existed in the past and were the subject of diverse perception practices, only now have they gained their due status. This is no doubt the result of the collapse of the vertical order of culture and its replacement by a horizontal one.

Naturally, many factors have contributed to this situation. It is noteworthy at this point to indicate the unique process of the emergence of digital art.¹⁶ Actually, its foundations were laid by IT programmers rather than by artists.¹⁷ Hence the violation of the traditional perception of qualifications necessary to be an artist. The new media, moreover, changed the perception of aesthetic criteria which helped evaluate individual work. Naturally, now when discussing the history of digital art, many references are made to the first avant-garde which anticipated the later discoveries in the field of new media. Lev Manovich put forth the thesis that it is precisely the new media which are the adequate medium for the pursuits of modernist art from the early 20th century. It is therefore hardly surprising that a discussion of the origins of digital art addresses both the achievements in the construction and use of computers and the new ideas harboured by artists in their minds.

When seeking the roots of computer art, scholars point to Dadaism, the accomplishments of the Bauhaus and the pursuits of the Constructivists. Special attention is paid to the work of Marcel Duchamp, László Moholy-Nagy and Antoni Pevsner and Naum Gabo, who were later emulated extensively by the artists of Fluxus, OULIPO and the Conceptualists.¹⁸ In Poland, in turn, mention is made of the groups Blok and Preasens.¹⁹ The possibilities of development of digital art after World War II in Poland were limited, as there was no place there for institutions such as the International Federation of Information Processing, which in the 1960s took interest in the use of computer technologies in the artistic process, or the London-based Computer Arts Society. The Warsaw Institute of Mathematical Machines cannot boast of any similar projects at that time. When discussing the pursuits of Peter Struycken, Marek Hołyński indicates a way of programming a machine

¹⁶ Apart from digital art there is also net art. In this approach the Internet is both an artistic medium and an exhibition environment. See Ewa Wójtowicz, *Net Art*, Kraków 2008.

¹⁷ Suffice it to mention here Allan Suttcliffe, Lejaren A. Hiller, Michel Noll, Georg Ness and Frieder Nake.

¹⁸ Paul, *op. cit.*, pp. 11–13.

¹⁹ Marek Hołyński, *Sztuka i komputery*, Warszawa 1976, p. 93.

which leaves room for chance between the artist's intention and the computer algorithm. Ryszard Winiarski created his paintings roughly at that time; he exposed in them the stochastic process, which is obtained through a die roll. This illustrates the difference between the activities carried out in Poland and those in the West.

In principle, digital art started to grow dynamically in Poland in the early 1990s. The same is actually true for everywhere else. Earlier artistic explorations did not lose their significance, yet because of the commercialisation of the Internet, very quickly the levels became roughly the same. Thus, globalisation has had a revolutionary impact on everybody, including artists living in different parts of the planet. If, then, the diverse discussions indicate two tendencies in digital art, this is valid for all those places where the new IT tools have reached. Therefore, in art, digital technologies can be treated as both a tool and a medium,²⁰ in that, respectively, the machine is used to gain the objectives acquired earlier by traditional techniques and in that it creates something which would never be possible in that form were it not for that specific vehicle.

The computer, then, is treated as a tool for graphic design. We mean here its wide spectrum. The computer is extremely useful in preparing publications, starting with the cover. The publishing market was revived after the change of the political and economic system in Poland in 1989. Readers were offered the kinds of books that had virtually been non-existent before. I do not mean here underground literature – this was to a large extent also popular literature, and of different provenance at that. This situation led to fighting for the reader on the market. The dust jacket, more than anything else, served as an element attracting the reader's attention. As a result, many covers that were far from the art of graphic design appeared at that time. Very often they were made by people who had not been professional illustrators before; employed in mushrooming publishing houses were people able to apply graphics software but with no corresponding artistic competences. All of this was supposed to slash production costs.

This state of affairs prevailed in the last decade of the 20th century. Later the situation began to slowly change, to reach a state of equilibrium between rubbish and, many times, truly artistic work. In the latter case we can speak of a return to the tradition of great artists' excellent graphic designs of covers. Suffice it to mention here Waldemar Świerzy, who was a designer recognisable not only by connoisseurs but also because he translated his experience of being a poster designer into book covers. He masterfully used the sign, which had a profound semantic potential. Other recognisable artists in this field included, e.g. Jan Bokiewicz and Wojciech Freudenreich. Both were excellent graphic designers and the essence of their work consisted in the elimination of superfluous elements. This seemingly ascetic effect of their work facilitated the fulfilment of an objective which was important for designers, namely to follow the maxim of "fewer signs, more content." Similar models were also followed by artists who used the computer in their work.

²⁰ Paul, *op. cit.*, p. 27 and 67.

Over the past decade designers have become used to the computer as a tool. Not only have they made use of the capacities of graphics software but they have also subordinated computer programs to further their own ideas. This led to the appearance of more and more covers on the market in which one could not tell if they were designed with the help of a computer or thanks to more traditional methods. The above statement is no value judgement, however; ultimately, what matters is the effect of the creative endeavours rather than the manner adopted to reach them. Still, of significance here is the popularisation of a particular aesthetics, disseminated via the computer screen, and not only among computer users. This aspect was aptly discerned and applied by Mirosław Adamczyk, who designed entire series in publishing houses (e.g. Zysk i Ska). A characteristic feature of his design would be the use, disseminated *via* computer tools, of icons or icon look-alikes which helped to communicate specific messages. Not infrequently did he present an image obtained through the use of low density. This set of measures made his covers recognisable at a glance and besides, as refined graphics, they attracted the attention of the potential reader in the plethora of books offered by bookstores.

Of similar value are also designs by Stanisław Salij, who works for the *słowo/obraz terytoria* publishing house. With time, the simplicity of means and the semantic depth of the signs that were applied became his signature. He often creates visual puzzles in his works, and the intention to solve the mystery may motivate the potential customer to choose his book. The artist uses a number of measures, such as full-cover drawings, signs or photographs. Despite the diversity, the authorship of the design remains unmistakable. Equally eye-catching are the covers and dust jackets of Lech Robakiewicz, a collaborator of Wydawnictwo KR publishing house. The measures he uses are not excessively austere and yet perfectly build up information about the book they visually represent. He frequently applies collage, which looks attractive, yet sometimes some of the lettering does not sufficiently stand out of the backdrop. Actually, while this should be reason to complain, it provokes the heightened attention of the person looking at the book. The few examples above are to demonstrate that the market of graphic design of covers was regained by professionals, and home-made graphic designers have less and less to offer in this respect. No respectable publisher will cut the costs of publishing a book by giving up cooperation with a professional. Last but not least, use of the computer in graphic design has immeasurable benefits.

When describing at length the design of covers, one should now refer to the contents they hide. No doubt the capacities offered by the computer and the ease of offset print have substantially extended the game field. This is best evident in the publications of textbooks or self-help literature. Lettering diversified as to both size and font, the use of uniform backgrounds under selected excerpts of text or images and printing sidewise on the one hand diversifies the information contained in the book and, on the other hand, is a challenge for the designer composing the page. This is not simple typesetting but also graphic creation. Such challenges result in more sophisticated publications that take part in an art event, such as exhibition catalogues or albums accompanying such events. No

doubt there are many possibilities and equally many realised ideas in this field. At this point I wish to mention one of the most interesting graphic designers who made visual organisation of the page one of the designer's fundamental tasks – Mirosław Pawłowski. For him each element located on an unprinted surface remains a sign related to the other signs. In other words, we conclude that the printed text and the illustration are equally significant. Moreover, also the unprinted place will have the same importance. Pawłowski makes use of these elements to create a visual quality which may evidently be an excellent example of computer graphics.

It is worthwhile at this point to mention the so-called annual reports of companies that are inaccessible to most readers and are published for the companies' shareholders. As a rule these are small design masterpieces. Similar publications are to foster the good image of an institution. As a result, selected best photographers and graphic designers create a publication that may be easily compared to the most refined magazines.

Speaking about the use of computers in graphic design, one should also mention posters, especially that initially, i.e. in the early 1990s, they assumed the very controversial form of American film or commercial posters. This was a degrading phenomenon for Polish culture, which had developed a recognisable poster school. Instead of a conceptual graphic sign we received a pop culture photograph, and instead of an adequately used letter, treated as in painting or in another way singled out, we had standard print resembling that of an advertising brochure. Again, we might say, artists awaited a better time in the hope that the rich legacy of Polish posters would not be forgotten. Fortunately, this did happen. We may easily provide a list of artists who, on the one hand, perpetuated the post-war tradition of posters and, on the other hand, contributed many of their own new ideas, some of which at least were a consequence of using computers in the design process. By focusing on these particular names I do not wish to expose uniqueness but rather a representative nature. I also realise that to the list may be added other names of poster artists. So, out of a sense of duty I will mention artists who apply computer tools, such as Piotr Kunca, Grzegorz Marszałek, Michał Kliś, Roman Kalarus, Grzegorz Skorwider and Bogusław Lustyk.

Finally, I would like to mention the animated film, whose production could be much faster and less time-consuming thanks to computer technologies. The Television Studio of Animated Films was set up in Poznań in 1980. This was a truly unique project which made films for children and young people with the aid of classical techniques, such as e.g. drawing, painting and cut-outs. The studio received numerous awards at domestic and international events. It was here that *Tales from the Kingdom of Lailonia* by Leszek Kołakowski were made. In 2001 these productions proved too costly for state television, and the studio was closed down. Fortunately, a company called TV Studio Filmów Animowanych Sp. z o.o. was established instead; its productions use computer animation techniques. These no doubt lower production costs but at the same time widen the array of artistic measures used by the authors. Interestingly, the team making up the studio, e.g. Jacek Adamczak, Robert Turło, Andrzej Kukuła, Aniela Lubieniecka and Joanna Jasiń-

ska-Koronkiewicz, continue to receive many awards and are widely acclaimed in Poland and abroad. Speaking of success stories, I must mention here Tomek Bagiński, whose *Cathedral* was nominated for the Academy Award (Oscar) in the best animated short film category. Since then he has made a number of productions and co-productions, to mention only three parts of *The Witcher* and *Seven Gates of Jerusalem*, which were equally internationally acclaimed and awarded.

An attempt to describe the pursuits which treat the computer as a medium is far more difficult than an attempt to describe those addressing the computer used as a tool; there is a reason for this. In fact, the above experience fit the way of communication which led from the sender to the addressee. There was no exchange of information, let alone interaction, between the two. However, when we start talking about the computer as a medium for art projects, the situation changes dramatically. First of all, we need to remember about the exchange of roles between the sender and the recipient. The effect of creative work is interactive. In this perspective the artist who makes a particular project may not, or rather should not know the final outcome of his or her efforts. The artist's task is to initiate a certain communication situation that cannot be controlled (as Marina Abramović did in *The Artist is Present*, when the artist may encourage the interaction of everyone, whose behaviour is unpredictable; naturally, this example has little to do with digital art but shows affinities to it in the field of interaction). The best exemplification of this approach to the problem was an exhibition held in 2003 at Zachęta Gallery in Warsaw. Although it was called *Natarcie Netartu (Netart Advance)*, it was in fact supposed to promote the art of the new media and for the new media. In this it resembled the 1968 exhibition from London, i.e. *Cybernetic Serendipity*, as it was also a promotional and educational project. It is in order to present here the participants of the Netart show: Rafał Bujnowski, Tomasz Dubielewicz, Bartek Felczak, Bartek Kujawski, Piotr Łupiński, Anna Nałęcka, Agata Raczyńska, Bartek Rogalewicz, Michał Rostocki, Rafał Szczepaniak, Adam Szrotek, Dominika Zacharski, and the Twożywo group. What else can we say? I guess that the artists are still active, also in the field of net art. Thus they participate in the area of design, whose objective is to design new communication relations in the online community. This, however, is subject matter for another story.



SPECTRUM, Robert B. Lisek, Leto Gallery, Warszawa, 2008



ENGINE, Robert B. Lisek, Zachęta National Gallery of Art, Warszawa, 2007



Analog Immigration, Przemysław Jasielski, CSU Galleries, Cleveland, 2013



Oceanus, Paweł Janicki, from the WRO Art Center archive, 2011

The real and the unreal. The media in the theatre of Krzysztof Garbaczewski and Wojtek Ziemilski

The theatre (a show, performance) ... never simply “exists” but is created as a result of dynamic configurations and transmissions of its individual elements (and media). The relations occurring between them lead to emerging, ever different forms of representation, dramaturgic strategies, rules of structuring and staging the word, image or sound, and also various possibilities of positioning the body in time and space, to developing specific methods of perception and perceiving or generating cultural, social and psychological meanings. As a kind of game the theatre is never one which is *strictly* subjective, contrived and controlled by one specific subject, but is a *media process* which mediates the decisions of its participants, namely the authors and viewers.¹

This fragment of a famous book by Dorota Sajewska entitled *Pod okupacją mediów* (the title is borrowed from Paul Virilio) as quoted above is quite important because it constitutes some evidence of the change occurring in the Polish way of thinking about the relation between theatre and the media. Although the media have been present in the national theatre for a long time (it is suffice to recall such various phenomena as a monitor in the dressing room used as the audience house and transmitting shots from the stage during the performance of *Hamlet IV* directed by Andrzej Wajda; or a project to include in the performance some TV programmes transmitted during its broadcasting time as peculiar “interventions into reality” in *Kartoteka rozrzucona* (*Scattered Files*) by Tadeusz Różewicz; or a large screen film narrative of the performances shown in the Poza Video theatre by Jolanta Lothe and Piotr Lachmann), only recently has using these media become common practice. But they are still treated mostly as a state-of-the-art element of set design (screenings) or as tools which extend acting possibilities (micro ports, video cameras); rarely is it noticed how the media help artists to adjust their language to the perception of the contemporary viewer and to define the role which the theatre plays in the new reality.

¹ Dorota Sajewska, *Pod okupacją mediów*, Warszawa 2012, pp. 51-52; parts underlined by the author.

A sudden increase in interest in the media in modern Polish theatre at the turn of the millennia was noticeable in the work of such directors as Krzysztof Warlikowski, Grzegorz Jarzyna, Jan Klata, Maja Kleczewska, Barbara Wysocka, Michał Zadara and Wiktor Rubin, all of which, to a great extent, stems from a fascination with German theatre; mostly that of Frank Castorf, who already in the 1980s made the media one of the hallmarks of his theatre and, to a lesser extent, also René Pollesch, Stefan Pucher, Christoph Schlingensiefel, and the Rimini Protokoll Collective. American theatre, with Robert Wilson and The Wooster Group at the forefront, also played an inspiring role, but to a lesser degree (it was nevertheless very important to such artists as Łukasz Twarkowski and Paweł Passini, directors, or to the video artist Zbigniew Bzymek, who cooperated with Elizabeth LeCompte and Krystian Lupa).

The Castorf theatre formula seems to set the prospects of perceiving the theatrical potential of the media by the younger generation of Polish directors. Two polar extremes of this perception will be two performances prepared by the Eastern German artist before and after the Reunification.

In 1988, Castorf staged *An Enemy of the People* by Henrik Ibsen in the Städtisches Theatre in Karl-Marx-Stadt. It was a show he assessed as follows several years later: "At that time it was one of my best, politically engaged and ferocious performances."² In an attempt to reflect the atmosphere of Eastern Europe, Castorf created a show in which a claustrophobic lack of space was combined with a frightening transparency, as in a lab terrarium. Viewers who wanted to see the show crawled into the theatre through a tight window in the toilet in order to peep at what was going on in the flat of the main character, Doctor Stockman. Simultaneously, the rooms belonging to the doctor and his family were invaded by the world of politics in the form of gigantic faces of politicians speaking from dozens of TV screens on the stage, broadcasting authentic speeches and sessions.

Castorf showed the ambiguity of the procedure of watching through a keyhole that was so fundamental to theatre, i.e. on the one hand, voyeurism which satisfies the curiosity of the voyeur and the exhibitionist nature of the artists embracing it, on the other hand, the "soft" incapacitation, absolute and omnipresent control. *An Enemy of the People* was a performance which analysed the methods of Big Brother, although not the one from the reality show but the one presented in Orwell's *1984* novel. The performance indicates a political track in treating the media, whose characteristic feature is strong evaluation – the works of such researchers as Jean Baudrillard or Paul Virilio will constitute its theoretical support. The media will come under close scrutiny as being tools of manipulation, violence, and establishing and strengthening the hierarchy and social divisions.

Another key performance by Castorf is *An Idiot*, based on the novel by Fyodor Dostoyevsky and staged in 2002 in the Volksbühne am Rosa-Luxemburg-Platz in Berlin. It was a performance in which the most crucial and provocative gesture was closing the theatri-

² Jürgen Balitzki, *Castorf, der Eisenhändler. Theater zwischen Kartoffelsalat und Stahlgewitter*, Berlin 1995, p. 65.

cal “fourth wall” with a real wall and thus forcing the viewers to follow what was happening behind it only by watching a transmission broadcast by cameras and screens. As Erika Fischer-Lichte wrote about the performance:

When going to the theatre one assumes a bodily coexistence of actors and viewers, but one does not miss it in the cinema or on TV. Whereas in this performance, thanks to a peculiar kind of mediatisation, the physical presence of the actors was all the time exposed to danger. When the bodies disappeared, the feedback loop stopped functioning, or at least so it may have seemed. The viewers had a video image in front of their eyes and therefore they could exert an influence on the actors only indirectly. However, they did not have complete certainty whether the actors were receiving their reactions, whether they were actually inside the building or perhaps they were already resting in the bar or a dressing room. Then the feedback loop stopped working. The viewers’ longing for the physical return of the actors referred also to mutual perception and being perceived, which sets off the feedback loop constituting the performance. In *An Idiot* the process of the mediatisation of the performance was incorporated into it, leading at the same time – as Auslander claims – to the engulfment of the live performance by its mediatisation.³

In her interpretation, Fischer-Lichte emphasises that Castorf’s performance was paradoxically the triumphant song of a “traditional” live theatre, i.e. based on creating a feedback loop: the interaction between the performers and the viewers. The viewers did not prefer (as Auslander would like to interpret it) the image on the screens but were looking forward to the reappearance of live actors. However, it seems to me that this was not what the director had had in mind. Naturally, *An Idiot* topicalises “the process of own mediatisation,” it remains mostly an interesting reflection on the subject of representation. Castorf’s performance gives rise to many questions: What does it represent? Is the fact that we witness a representation of something proof for the ontological independence of this thing? What is the relation between what was shown and what will never be shown and will remain “behind the scenes” forever? What is the relation between the image and the experience of the viewers? Thus, *An Idiot* would represent a different (although not excluding the former) track in the reflection over the media, which could be described as “ontological.”

The most significant contemporary Polish directors who use the media in the theatre and analyse them from such a political and ontological perspective are Krzysztof Garbaczewski and Wojtek Ziemilski (if one takes the moment of their debut into consideration then they represent the youngest generation, which is different not only from the generation represented by Warlikowski and Jarzyna, but also Klata, Kleczewska and Zadara). Their work with the media seems to be more conscious and fruitful from the artistic point of view, and a comparison of the methods and effects of their work can be interesting, considering that they use similar tools and methods in various ways while pursuing com-

³ Erika Fischer-Lichte, *Estetyka performatywności*, transl. by M. Borowski and M. Sugiera, Kraków 2008, p. 119.

pletely different goals. What they have in common, though, is the fact that they both emphasise the procedural character of the theatre and they use the media to redefine the relation between the stage and the audience. Also, they constantly go beyond the strict borders of what is understood as the director's function in order to control all the elements of the performance themselves – as artists of the Great Reform (Garbaczewski in *The Odyssey* is the director and co-author of the adaptation, set design, video projection and music preparation; Ziemilski in *Small Narration* is the co-author of the text, the director, editor, video operator and actor).

When describing the theatre of Garbaczewski and Ziemilski, I would like to distinguish three levels of the use of the media in theatre, following the division proposed by David Roesner when he wrote about making theatre more musical⁴. The first is the influence of the media on the creation process and rehearsals (inspiration level); the second is using media in the performance as an element organising its structure (ordering, connecting, fragmenting, completing and counterpointing); the third is about media and the process of perception and reception of a work of art. In the artistic output of both of these young directors the media are present at every stage of work – which is also a novelty in the Polish theatre tradition.

The Web and the camera

The Web is the natural environment of a contemporary wild man. Therefore, our performance is not *science fiction*. It describes people who can be encountered already nowadays. There will be even more of them in the future.⁵

This is how Jacek Poniedziałek, who played the role of Bronisław Malinowski in Krzysztof Garbaczewski's performance titled *The Sexual Life of Savages*, explained its genesis. As a matter of fact, the director and his co-workers constitute a showcase of "Internet indigenes" who intensely mark their presence in the Web by being present on social networking sites and video channels which record work on the performances (such as *Odyssey*) on specially created websites which enable interaction with potential viewers who thrive on pop culture, i.e. computer games, video clips, films, memes and literary hyper-texts.

For those "wild" ones it is natural to look at the world through a camera; there are significant anecdotes about Garbaczewski who, as a student at the Directing Faculty, participated in rehearsals for the *Factory 2* performance directed by Krystian Lupa which lasted

⁴ David Roesner, *Theater als Musik. Verfahren der Musikalisierung in chorischen Theaterformen bei Christoph Marthaler, Einar Schleef und Robert Wilson*, Tübingen 2003.

⁵ "Heteroseksualiści, wyluzujcie się, interview with Jacek Poniedziałek by Jacek Cieślak," *Rzeczpospolita* [online], 11 June 2011, available from: http://www.e-teatr.pl/pl/artykuly/118992.html?josso_assertion_id=F53D26BFD7780E2F [accessed: 14 September 2013].

many months and he almost never put down the small camera which he used to film everything happening around him (thus, oddly adding one more layer to a complex situation in which the actors found themselves as they watched Warhol's films during rehearsals and improvised in front of the camera in a "confession cam," as in Warhol's "screen tests"). In this context it is not surprising that, when preparing the *Death Star* performance (at the Teatr Dramatyczny in Wałbrzych during the season known as *We know it, we know it very well*, where instead of staging dramas, other texts of culture were recycled and remixed, such as films, series or fairy-tales), he did not limit himself to the dialogue with the iconic film cycle of *Star Wars* by George Lucas, but also referred to the documentary *The Making of 'Star Wars'* by Robert Guenette and equipped the actors with hand-held cameras which allowed them to constantly record great close-ups (and screen them to viewers) of their expressions, gestures and acts.

Although there is a large amount of talking in Garbaczewski's theatre, it is not a logocentric theatre. It rarely stages dramas (exceptions are such performances as *Sports Choir* by Elfriede Jelinek, which is very distant from traditional forms of drama, or *Iwona, księżniczka Burgunda* (Yvonne, Princess of Burgundy) by Witold Gombrowicz, or *Balladyna* (Balladine) by Juliusz Słowacki). As inspiration and a starting point he uses prosaic or poetic epic works (*Possessed* by Gombrowicz, *The Devils* by Dostoyevsky, *The Odyssey* by Homer, or *Stone Heaven* by Jerzy Krzysztoń), texts beyond literary fiction (*Tibetan Book of the Dead* in the *Nirvana* performance, *Kronos Diary* by Gombrowicz, *Sexual Life of Savages* by Bronisław Malinowski), and texts of visual and film culture (*Star Wars* as mentioned above, *Guide to the Kings and Princes of Poland*). When working on the script of the performance, Garbaczewski "rubs" the original text with other texts of culture (in the case of *Possessed* and *Yvonne* he does this mostly with famous horrors and crime stories, in *The Odyssey* – mostly with *Ulysses* by James Joyce and *Derision* by Jean-Luc Godard, in *Stone Heaven instead of Stars* devoted to the Warsaw Uprising – with computer games and zombie movies), he gathers quotations and clashes of clichés. As Żelisław Żelislowski rightly emphasises:

Confronting the text is not an experience of a closed entity but rather spreading a network of interconnections and hyperlinks. It is like moving in the thicket of small meanings. Piling up the quoted material makes us recognise the source only in some cases and notice the fact of repetition. However, we will certainly not overlook the act of quoting itself and skipping between various discourses, which, when confronted with one another, resonate in non-obvious relations. They exist as a flash and unclear reminder. Garbaczewski is interested in something which can be called the experience of cultural interface: the influence of hyper-textual and intermedia quality on contemporary art and reality, and most of all on perception and communication mechanisms: the ways of shaping the information flow between the text of culture and the recipient.⁶

⁶ Żelisław Żelislowski, "Urucho ponownie. Strategie przeciw-reżyserskie Krzysztofa Garbaczewskiego," *Didaskalia*, no. 108, 2012, p. 76.

The response to this *Gesamtkunstwerk* idea is, in the case of Garbaczewski, a convergence, association and integration of phenomena from various communication areas, and also creating some enclaves of free co-workers' expression within auteur performances (acting, dancing and music improvisations in *The Odyssey* or *Balladine*, or the interactive installation of *Island* created by the architect Aleksandra Wasilkowska in *Sexual Life of Savages*).

In the network, which is a biotope of this theatre, entities are not valued or put in a hierarchical order, hence many of the director's digressions towards post-humanism, bioart, transgenic art and inspirations by experiments conducted by Roman Kirschner and Eduardo Kac. *Island*, as mentioned above, was a three-dimensional construction over the stage equipped with sensors – which is an example of “living matter” and artificial intelligence responding to the movements of actors and the audience. In *Balladine*, the plot of Słowacki's drama is transferred to a modern laboratory in which scientists are working on a genotype of humans and plants. Filon crosses his genetic material with that of a petunia, creating Filotunia; a transformation of Grabiec into a tree was of a similar character.

Besides transgressing the line between a human being and an animal/plant, Garbaczewski's theatre also transgresses the borderline between a human being and technology. The director regularly uses micro ports and cameras, the stage features not only actors playing live but also their media-like images on the screens and projection surfaces. However, the video used by the artist does not serve only to obtain a particular aesthetic value or to enhance the presence of an actor on the stage because, thanks to zooming lenses and sensitive microphones, he or she can be watched and listened to in an extremely intimate way. As Joanna Jopek remarked, Garbaczewski tells us to think about a medium as “a carrier which sets its own rules of representation. It decides what can be represented and hence what can exist.”⁷

The world presented in Garbaczewski's theatre appears in a scattered, fragmentary and disorderly form; the hyper-textuality mentioned by Żelisławski translates into the process of abandoning great linear narrations for rootstocks. It is accompanied by a constant tension between the visible and the invisible: in the debut performance of *Possessed*, during the key scene presenting the dark sexual family secrets of the Prince, a huge spotlight shines on the eyes of the viewers so strongly that they are not able to identify naked bodies in the bed or to tell what is truly going on with them. For most of the time the viewers may only watch the killed Maliniak on the screen as he tells about his death to the camera and directs the investigation (thus the medium functions as a transmission channel between the real world and the other world). Garbaczewski seems to be an avid reader of Barthes (the media and mourning ritual), of Lacan (the possibility of insight into the Real through the fictional), and of Auslander (the tension between a “live” performance and media-like qualities). His statement about the monumental *Roman Tragedies* directed by

⁷ Joanna Jopek, “Medium albo terytorium. Medialność w spektaklach Krzysztofa Garbaczewskiego,” *Didaskalia*, no. 108, 2012, p. 82.

Iwo van Hove using video cameras seems significant here. The director made the following comment about the performance:

Many people would admit that it was a great performance.
It spoke to me using three dramas transferred
into the space of the ancient Agora TV,
when the audience captured
the whole stage space for themselves, but there was
one point, one place, to which they did not have access.
It was the place of the death of the heroes.
It is the place of the death of the performance.⁸

The place mentioned by Garbaczewski is the one where the omnipresent camera does not reach. There is no Real without a transmission, the disappearing image means the disappearance of a person. In *Death Star* the gesture of switching off the camera or the fading of the signal (then the word "loss" appears on the screen) has a technological dimension and at the same time an eschatological one. The director eagerly refers to the reflections of Lacan, who writes that we exist only in the sphere of language which builds up our sphere of consciousness; he admits that one of his ambitions is to "introduce the unnamed."⁹ The artist (admitting to being fascinated with the theatre of Tadeusz Kantor and Jerzy Grzegorzewski) declares that one of the most important themes of his performances is actually death as an experience which cannot be directly touched, neither on the level of "life" nor the mediated one:

... the experience of death as something external. We experience someone's death and either this is someone close and then we suffer or this is someone distant and then we do not, but generally we can manage both ways somehow. But experiencing one's own death is something completely different, something which we are completely not able to survive. As one of ancient philosophers said: when we exist there is no death; when there is death we do not exist. Hence, the issue of staging one's own death. Let's perform it, let's make a show out of it so that we can cope with it somehow. We are left with performing, being remembered and creating own myth.¹⁰

It is extremely important from an ontological perspective of the theatre world of Garbaczewski that he does not use video recordings prepared earlier, but always transmits live performances; even if the events do not happen entirely "here" (for most parts of *Yvonne, Princess of Burgundy*, *Balladine* or *Guide to the Kings of Poland* the actors play beyond the stage, separated from the audience by a wall which actually led to protests from some more conventionally oriented viewers), they are certainly happening 'now'. If we include

⁸ "Tragedie rzymskie. Sonda," *Didaskalia*, no. 94, 2009, pp. 70–71.

⁹ "Wciąganie marginesów. Joanna Jopek and Monika Kwaśniewska interview Krzysztof Garbaczewski," *Didaskalia*, no. 90, 2009, p. 40.

¹⁰ *Ibid.*

Garbaczewski's performances in the debate, which has been going on for several years regarding what relation arises in mixed-media performances between live actors and their film images, they will rather constitute evidence supporting Robert Blossom's¹¹ theory which suggests (contrary to Robert Edmond Jones¹²) that a film symbolises consciousness, whereas actors merely indicate a material presence. Thus, as Auslander writes, physical existence in this case will be only a reflection of the consciousness lying at its basis, and actors performing live will be a pale reflection of a mediated representation which dominates our cultural landscape.¹³

In Garbaczewski's theatre the phenomenon of the intensified presence of the actors on the screen and their mediated "death" through the disappearance of an image is connected with the subject matter of performances. Here, one of the basic categories is remembrance, the ways of conveying it, constructing and deconstructing it. Initially, it was an individual's remembrance, connected with self-identification and shaping of one's subjectivity; now it is increasingly a collective remembrance, one that interlaces with historical narration.

Such performances as *Guide to the Kings of Poland*, which presents the biographies of Polish monarchs in a non-canonical way, and was rewritten and retouched by many generations of historians, address the complex issue of creating meanings and preparing senses, the gradual separation of an image from a person completely appropriated by the community. Kings with their double status, as described by Ernst Kantorowicz,¹⁴ constitute a biological, individual body and an official image, are copied in many reproductions which are a carrier of their immortal "royalty," and are indeed a perfect example for reflections about the "reversed" mixed-media theatre, in which images and peculiar "avatars" play the main roles and attract the viewers' attention, whereas real bodies, being rather irrelevant for the course of action, remain beyond public interest.

An extremely interesting issue is the way that Garbaczewski programs the viewer's perception of his performances. A perception which, consciously or not, enables an infinite number of equally important interpretations. When commenting on an ambiguous perception of *Nirvana*, the director admitted:

It is really interesting that everyone thinks something different after the performance. It was not my assumption that the performance would be different for everyone, it is inconceivable. But I am happy I succeeded and I am happy that the theatre with such an open structure where every viewer constructs their own fulfilment and transition is possible in the first place. Thus, viewers become participants. I experience immense anxiety during the performance because I have no access to the others' experiences. ...

¹¹ See Roberts Blossom, "On Filmstage," *TDR. Tulane Drama Review*, vol. 1, 1966, p. 70.

¹² See Robert Edmond Jones, *The Dramatic Imagination*, New York 1941.

¹³ See Philip Auslander, *Liveness: Performance in a Mediatized Culture*, New York 2008.

¹⁴ See Ernst Kantorowicz, *Dwa ciała króla. Studium ze średniowiecznej teologii politycznej*, transl. by M. Michalski, A. Krawiec, Warszawa 2007.

It is interesting to what extent I create a figment of my imagination when going through *The Book* [*Tibetan Book of the Dead* which inspired *Nirvana* – ARB], and to what extent I am able to create a possible emanation of the viewer's mind, such a splitting process. I think that going through the *Tibetan Book* as God wants it, in a narrative way, would be safe. Every viewer is different and it is not possible to create it in such a model emanation. But generally it is the viewer's mind emanation that it is all about, so nothing that he or she experiences in this event is real, it is just an emanation of his or her experience and possible associations. In a way this performance does not communicate anything; it is just open to communication that can be triggered only by a viewer.¹⁵

Garbaczewski deconstructs a text as a traditional carrier of senses in the theatre and attacks the senses of the audience with increased visual and audial means which cannot be expressed by a linear language and do not offer a cohesive, unambiguous message to the viewer. Thus a viewer in his theatre does not follow a path of narration but is lost amidst a vast ocean of quotations, images and sounds and forced to navigate in a random direction. Simultaneously, the road itself is a goal, not a starting point, thus it can be safely stated that an ideal recipient of the young director's performances is a theatrical flâneur who finds pleasure in roaming among the possible meanings.

Garbaczewski requires that the viewer be active, but it is not an activity that would involve standing up from the seats and entering the plot of the performance. In this respect the author is immersed in the tradition of a box theatre, a bourgeois one. Activation of the public is in his performances only a purely intellectual activity.

Magdalena Talar¹⁶ coined the term "hyper-viewer" to describe a recipient of Garbaczewski's theatre. The term "hyper-viewer" comes from the word "hyper-text" and, on the one hand, it points to the unusual excess which is an imminent feature of Garbaczewski's theatre, and, on the other, it refers to the notion of hyperlinks embedded in an electronic file or on a website referring to another file or site (or another place in a given file or site), which when clicked open up a new file or site. The interface of Garbaczewski's theatre ideally matches the perception habits of the public at a time of the World Wide Web. On the one hand, the viewer remains in a safe place separated from reality by a screen. On the other hand, he or she is given unlimited freedom as far as harmonising the fragments of verbal and non-verbal narration offered to him or her is concerned and also as regards creating his or her own independent narration.

Krzysztof Garbaczewski's theatre seems to be a practical artistic realisation of the assumptions made by Bruno Latour.¹⁷ Latour defined the world as a network spread between technology, life and science. In a reality understood in this way the media are

¹⁵ "Wciąganie marginesów..." p. 38, 40.

¹⁶ Magdalena Talar, *Sztuka bycia hiperwidzem na podstawie Życia seksualnego dzikich* w reżyserii Krzysztofa Garbaczewskiego, unpublished BA thesis written under the supervision of Professor Małgorzata Sugiera, theatre studies UJ, year 2011/2012.

¹⁷ See Bruno Latour, *Nigdy nie byliśmy nowoczesni. Studium z antropologii symetrycznej*, transl. by M. Gdula, Warszawa 2011.

used for constant delegating and translating between the sphere of objects and subjects, among social, natural, artistic, sensual, and intellectual realms. The new media pave the way for a new culture. In contemporary mediated society, cognitive processes lose their individual character and become a feature of a collective subject, i.e. the web. The web gives the subject unlimited possibilities, enhancing his or her powers of perception, sharpening the senses, intensifying expression, and extending the field of range to infinity. However, such a situation is burdened with the risk of surfeit, excess of information and stimuli. This excess seems to be one of the main features of Garbaczewski's artistic language, the one that most strongly polarises the recipients of his theatre.

Game and map

Wojtek Ziemilski in his English-written blog devoted to modern art and titled *New Art* posted his reflections after watching *Hamlet* – a multimedia performance by The Wooster Group:

A man crosses the stage, says Peter Brook, and you have theatre.

Pathos. That's what you get when a man crosses the stage. Anthropocentrism. The idea that it's all about us, really. The sin of vanity in all its splendour.

Who are we, really (on stage)?

How do we conduct our paths (on stage)?

What can we see if we introduce breaks into the surface of our behaviour (on stage)?

The body becomes heavy.

It becomes an accessory. An object more than a tool. An instrument that cannot be played in a clean way is more of itself. It is less melody, and more instrument.

This body that struggles to fit into the image that will always outsmart it¹⁸.

Ziemilski's thinking about theatre is in a way a negation of the theatre as such. In his opinion, which is quoted above, the artist emphasises that traditional theatre is a culminating result of a misconception that everything revolves around a human being. With his blind faith in the community of believers and hierarchy of representation, he does not take into consideration the individual view of the viewer and that a real encounter takes place not on the stage but in the retina of the onlooker. Therefore, an artist proposes not as much entering the theatre as much as a multi-level game with it.

Due to his education, Wojtek Ziemilski is an exceptional figure in Polish theatre: he has a degree in Philosophy and Applied Linguistics from Warsaw University and finished a three-month non-academic course in theatre direction at the Gulbenkian Foundation in Lisbon. He describes himself as a theatre director and a video artist who creates works at

¹⁸ <http://new-art.blogspot.com/2009/08/wooster-groups-hamlet-aftermath.html> [accessed: 2 November 2013].

the crossroads of theatre, the visual arts and choreography. Similarly to Garbaczewski, he is present in the virtual reality in various ways (social networking sites, video channels, a blog). However, he is more interested in contemporary art than in feature films, particularly video or digital art. The artist's blog contains references to his library at <http://www.librarything.com>, where he has posted works that are particularly inspiring for his art, such as *Fast Forward: Media Art* by Fernanda Arruda, *Art and Electronic Media (Themes & Movements)* by Edward A. Shanken, *Video: The Reflexive Medium* by Yvonne Spielmann, classic works on photography (Barthes), performance (Carlson, McKenzie, Phelan, Goldberg, Lehmann), media (Dixon), and also the viewer and politics of theatre (Rancière, Lepecki). Similarly to the graduates of the legendary Institute of Applied Theatre Studies in Giessen (Rimini Protokoll, Showcase Beat Le Mot, Boris Nikitin), Ziemilski combines in his work the approach of an artist and a scientist, hence many of his projects have the characteristics of a laboratory experiment (the primary concept of the performance *Nowy porządek? (New Order?)* is constructed around an uncontrolled plot which takes place in an ant terrarium) or a performative lecture (*Small Narration, Laurie Anderson The United States*).

The first works by Ziemilski applied a camera as a medium imposing a certain form on a message. The debut performance of *Hamlet Light* at the Portuguese Teatro Municipal de Faro was a particular essence of Shakespearean tragedy: viewers watched actors in scenes which were supposed to be put together in a film trailer of a *Hamlet* performance that was never supposed to be created. In the finale the ready trailer (in a version for adults and younger viewers) was presented to the public. Theatre categories such as continuity, sequence of events and uniqueness were replaced by editing, the possibility of manipulating a sequence and the number of scenes. Actors playing simultaneously to the camera and to the viewers struggled to find a proper stage language, and also the audience members were forced to constantly review their perception habits and the way in which they read the scenes presented to them. The video installation entitled *Aktorzy. Część pierwsza: Rekonesans (Actors. First Part: Reconnaissance)* functioned in a similar way. It was a projection on the facade of the Teatr Rozmaitości in Warsaw showing actors laughing with or ridiculing (depending on the interpretation) viewers–passers-by.

The staging of the text entitled *Zapomniana wioska za górami (A Forgotten Village Beyond the Mountains)* was exceptionally interesting because it was a unique Ziemilski project (except for *Hamlet Light*, in which Shakespeare's drama was only a pretext) based on a drama. Philippe Blasband's text was read out by actors while two screens hanging above the stage presented the work in progress conducted by three sculptors: Alicja Wysocka, Wojciech Pustoła and Karol Słowik. In parallel with the read-out text they created sculptures from various objects (e.g. toothpicks, nails, sugar cubes). According to the description by Katarzyna Lemańska and Karolina Wycisk, the performance was based on the following premises:

The key moments for this project were the ones when something went wrong: the sculpture did not come out right, the artists were not focused or some technical problems appeared. Based

on the experience of these failures, Ziemilski created a structure of reading; for instance: when the text referred to riots in Iran, the construction collapsed. Everything that was going on on the sculpture table placed in the centre of the stage, at the back, was subordinated to the plot of the drama. A camera filmed the set from above. Images from the other two cameras were shot by camerawomen. The actors were sitting on chairs on the right, closer to the audience. Viewers watched the work of the sculptors on the screen on the left side. Ziemilski was sitting close to the sculptors and “edited” the image, deciding whether the main set or a detail only was to be shown. He controlled the images from three cameras so that the viewers could concentrate on what was, in his opinion, important. Improvisation was precisely controlled as the sculptors knew exactly when they should make the key moves. Even if they did not manage to synchronise their actions with the readers, the camera could freeze the image or speed it up, then at this level we can speak of manipulation using the Real Time Composition method or devising theatre. Ziemilski managed to create a new model of reading: not theatre-like but performance-like, by using common space and manipulating strategies which all of the creators had worked out during rehearsals.¹⁹

This is one of Ziemilski’s borderline projects, as he slowly abandons film and video art and moves towards the theatre understood as an event taking place (at least partly) here and now, in the presence of the viewers. In an interview devoted to the new media in the theatre, the director declared:

... I think that theatre does not have to be derivative. Art is not afraid to enter the ground of performance. Nobody asks him or herself whether rational aesthetics is still art or is not art anymore. Theatre could learn such insolence. It seems to be a great moment for theatre; the visual arts are moving towards performance, looking for another way of defining what an aesthetic experience can be. And theatre has ingenious tools for it. Video transformed by staging and live performance may become one of them.²⁰

It is worth confronting his statement with the words of Samuel Weber, who was looking for new theatre qualities on the crossroads:

The popularisation of new media intensifies experiencing the body as breaking an organic whole and as a machine. Such “media” cannot be considered a passive element or condition of staging “works” or acts. Because media transform the very places “in” which and through which they occur; not only individual subjects and objects, things and events but also traditional concepts of a place and a body as: a (firm) container and (moving) content, respectively. Actually, the new meaning of theatre and theatre qualities should be looked for in the context of transforming a place and a body by electronic media.²¹

¹⁹ Katarzyn Lemańska, Karolina Wycisk, “Under control and out of control,” *Didaskalia*, no. 117, 2013, pp. 38–39.

²⁰ “Medium czy gadżet? Wideo w teatrze.” The interlocutors are Mateusz Borowski, Mirek Kaczmarek, Bartek Macias, Wojciech Puś, Małgorzata Sugiera, Wojtek Ziemilski, *Didaskalia*, no. 107, 2012, p. 47.

²¹ Samuel Weber, *Teatralność jako medium*, transl. by J. Burzyński, Kraków 2009, p. 22.

Ziemilski is very much interested in the relation between an image and a real object, seeing and acting, mediatisation and live performance, a body in motion and an image in motion. Some of his works begin in the artist's encounter with a given piece of equipment and they are meant to explore the possibilities of this equipment. The project *Map* prepared at komuna//warszawa arose from the desire to create an artistic application for small, portable video projectors with a battery and an internal cache (the artist uses Samsung Pico SP H-03). Groups of viewers consisting of several people were led with the projectors into a small dark room. These small projectors were applied as a kind of map; by using them the participants displayed films recorded earlier on the walls (they were featured in them as actors), they adjusted the image from the devices to an actual place, followed the tips which they read from the films in the normal course. The viewers-participants were supposed to be Martians, male and female, who had just arrived and were looking around in surprise.

Naturally, the eponymous map refers as much to the real "instruction" of moving around the area, drawn by using conventional signs, as to a map understood as a method of translating various notions and relations between them into a visual message. A map is a classical form of representation based on the opposition between a real object/area and abstraction. It can also be connected to an IT definition of mapping as a process of assigning the resources of one system to other, often virtual ones.

Various phenomena undergo mapping in Ziemilski's projects. These are remembrance, identity and, finally, audience. His most famous performance, *Mała narracja (Small Narrative)*, is exactly of this kind – creating a map of memory and facts (real or unreal ones) in order to reach the truth. The performance arose from the need of "vetting" that the artist's grandfather had to be subjected to (Count Wojciech Dzieduszycki was accused of cooperating with the secret services) and self-vetting – in the face of discovering a tragic family secret in Polish history. The performance has the ascetic form of a performing lecture delivered by Ziemilski who reads, from a laptop, fragments of notes, texts of philosophy, reports from the Institute of National Remembrance and newspaper articles, and also presents facts from the research he conducted online (so the performance features short films from Youtube as quotations).

Ziemilski-the-performer presents the process of constructing his own identity (coming of age to become an artist, accepting his Polish identity which was rejected as an unwanted burden) in the form of a self-narrative. His experience ideally corresponds to what Ewa Partyga writes about regarding this form of discourse:

Our self-narrations out of necessity intersect with narrations of others, and the points of crossing sometimes are the most important construction hubs because they may change the course or form of the narration. At this point it is worth ... recalling Oedipus who is led to his identity by someone else's story, completely contradictory to his self-understanding so far.²²

²² Ewa Partyga, "Tożsamość dziś: narracyjna? dialogowa? performatywna?," *Przestrzenie Teorii*, vol. 10, 2008, p. 67.

In *Small Narrative*, identity works like a network, while the material presence of the body is a counterpoint for words and media images. Ziemilski refers to dance theatre, which is fundamental for his artistic development and which, contrary to the drama theatre constructing fiction (in the traditional version) or creating an effect of reality (in an avant-garde version of documentary theatre or verbatim), returns to the reality of the body:

It started together with a question whether every one of us is not a self-made man?
Whether he or she is not mostly their own body? Whether it is not the beginning and not the end?

...

It started when Cláudia Dias stuck some objects of everyday use to her body and they created a map, a guided tour around her world.

...

It started when a French choreographer Jérôme Bel decided that he wanted to reach himself. That if a dance means a body on the stage, then one should start with this.

...

It started when you were watching the performance of a French choreographer Xavier Le Roy, entitled *Self Unfinished*. Le Roy assumes that we are not something uniform although apparently it comes down to one body.²³

Ziemilski intertwines the above comments with parts of recordings and reading excerpts from reviews of the performances mentioned. The documents combined, even if they do not create a uniform coherent and unambiguous whole which can be clearly interpreted, make it possible to outline and expand the borders of a personal map of notions which are important for the performer. This is also true of the performance *Laurie Anderson The United States* (inspired by the record *United States Live* and the artist's confession that she likes dreams), in which the artist, standing at a distance from the viewers, repeated to the microphone a previously recorded script with dreams of Poles which was transmitted to him on the headphones.

A surprising effect of various maps overlapping was used by Ziemilski in the performance *Pokrewni (Related)*, prepared within the Asian idiom during Malta Festival 2012. The performance was a combination of several parts: a convoluted film projection, utterances of the actors invited to take part in the performance, e.g. Chinese women living in Poznań, and translations of their lines read out live by the director. A story about the huge Huang family (one of the most numerous Chinese families) overlapped with a map of the world (a funny film made from several dozen recordings found on Youtube presenting people with the Huang family name living in various parts of the world and singing the song *Imagine* by John Lennon) and a map of Poznań (Ziemilski calculated precisely how many square meters and how many hectolitres of water are needed to put up all the Huangs in the capital of Wielkopolska during their family reunion). Abstract notions such as family, nationality and race are translated by the media into specific figures, schemes or diagrams.

²³ Wojtek Ziemilski, "Mała narracja," typescript, pp. 2–3.

Ziemilski combines various levels of discourse: from a socio-political reflection touching upon current controversial issues of national identity to a reflection on what is real and unreal, and the methods of manipulating these notions.

The viewer is in the centre of many of Ziemilski's projects as someone who needs to be recognised, examined and activated. In the performance *Prolog*, as in *Map*, the artist examined the mechanisms of reception in both the collective and individual dimension.

The performance started when a small audience (of about ten people) entered the stage of an empty theatre hall. The viewers listened to the following instructions, which they heard through wireless headphones:

Each of you has received a set of headphones. Thanks to the headphones you can hear a voice, in this case mine – the voice of the prologue which will lead you. Is the volume high enough? If not, make sure that you adjust it to be right. Find the volume button on the right of the headphones.

Please do not remove the headphones. Check if your neighbours, that is other viewers, have their headphones on. There should be a green diode lit on one side.

Please refrain from smoking.

Please don't use mobile phones.

Please turn the mobile phones off completely.

Please go ahead and turn off not only the volume but the mobile device as such.

If you adjusted the headphones and turned off your mobile phones, we can continue.

Welcome.

I am the voice of the prologue. I will lead you. I am with you constantly and I am watching you all the time. Don't worry about it. It serves the safety of the group and the success of the prologue.

I am impartial. I am not biased. I am here to help you. To support you.

If I was a recording, I could be one of the people around you.

But I am not a recording, which can be heard in my every language mistake.²⁴

Then the audience members took their seats (depending on the subjective feeling of comfort in a given situation) on the "coordinate system" and were asked to answer "choreographically" questions from the statistical survey examining the attitudes of the audience in a theatre ("Do you consider yourself a theatre goer? If so, take a small step forward. If not, please stay put. Do you get more involved in the cinema than in the theatre? If so, take a step backwards. If not, please stay put"²⁵). The director himself along with his assistants observed the movement of the viewers registered by the camera on the screen and wrote down the answers (in this project Ziemilski dreamt of using some movement-registering sensors and software which would make it possible to transform this movement into statistics and thus make the work much easier, but this was impossible due to financial reasons). The map of the audience was created on the basis of the data

²⁴ Wojtek Ziemilski, "Prolog," typescript, p. 1.

²⁵ Ibid., pp. 2–3.

collected; the place on the stage where at the end of the survey the viewers had found themselves, after taking steps forwards, backwards and sideways, was the image-sum of their attitude towards the theatre. In the last part of the performance the map was presented to the viewers in a projection displayed on the vault of the theatre; using Photoshop the creators of the performance drew relations between the viewers, and in this pictorial account (literally) presented the results of their study. The performance, as the play entitled *Public Berated* by Peter Handke, finished in accusing the viewers of passivity, of looking for virtual stimuli and fruitless emotions in the theatrical world of simulacra.

In the case of Ziemilski it is very interesting that, although he uses media so eagerly (and expels actors from his theatre by replacing them with performers or forcing the viewers to adopt roles traditionally attributed to actors), he simultaneously creates performances that are incredibly deeply rooted in what is real. The audience members in Ziemilski's performances find out how much and how little power they have at the same time, and how passive they are waiting for the theatre to make them active, to change their lives. His experiments can be commented on by quoting the remark of Erika Fischer-Lichte:

In the process which creates a performance, thanks to the mutual interaction of actors and viewers, the very performance creates them. Actors and viewers with their actions are the elements of a feedback loop, those who are created by the performance itself.²⁶

Paradoxically, Ziemilski does not map theatre but reality. The use of his theatre and media maps leads to creating a particular kind of reality during the performance, which together with the participating viewers has a chance to "spill out" of the theatre building. By exposing the methods of working with the media, Ziemilski expels the audience from the temple of simulacra to bring them back to their non-virtual life.

Anti-media theatre

The quest embarked on by Krzysztof Garbaczewski and Wojtek Ziemilski, who on Polish soil distinguish themselves by their artistic and technological courage, paradoxically makes us aware how far behind the Polish theatre lags as regards application of the media. It is worth looking into the possible causes of this situation.

The first of these is undoubtedly the historical burden which causes that the media (mass media, in line with the slogan of "TV lies," but not only) are definitely negatively perceived by associations with Orwell's prose. It is by no means a coincidence that one of the most frequently quoted and transformed media images in Polish theatre is the image of General Wojciech Jaruzelski proclaiming martial law in Poland to the accompaniment of Chopin's music (it was last used in the performance titled *Chopin Without the Piano* directed by Michał Zadara). The media are associated with political oppression, the totali-

²⁶ Fischer-Lichte, op. cit., p. 78.

tarian regime, manipulation, and threat. It seems that at a time when occasional discussions take place regarding online surveillance, it is difficult to change the above attitude to a neutral one.

It is connected with a glorification of the theatre as a place where "a live, real and emotional human" is still present, contrary to media imposture. The conservatives come up with apocalyptic visions of the human being of the future, an antisocial dunce incapable of getting and staying in touch with another person, wearing a helmet and holding a console, he or she is immersed in the imitations of life offered by video games. The theatre appears here as a sanctuary of truth and reality; the actors on the stage almost gain the status of a bunch of eccentrics surrounded by a sacred aura which Walter Benjamin wrote about, while the mediated actors are merely copies deprived of an ontological burden. As Małgorzata Sugiera and Mateusz Borowski write:

Emphasising the "live" performance as a distinctive feature of the theatre in the new media culture maintained its image as the only kind of art which remains a sanctuary of real human contact, a utopian enclave of non-mediated relations in a world dominated by digital simulation.²⁷

Not accidentally, commercial theatres use a kind of hunger for live performance by advertising their productions with slogans such as "the only opportunity to see Kuba Wojewódzki, a TV celebrity." Another trick, used both by theatres with an entertainment profile and those with a more ambitious repertoire, is to use in their performances various interactions between the stage and the audience (the audience very intensely experiences all "close encounters of the third kind": being touched, chatted to or offered something to eat by a star) and to enable the audience to participate in some talks after the show or to even have a photo session with the actors.

Another reason is the very special hierarchy which is still prevalent in national repertoire theatres, i.e. both the hierarchy of means used in the show and the tasks of the artists. Despite the increasingly brave introduction of various means, taken from dance, for instance, Polish theatre is still completely logocentric, based on telling stories and constructing a consistent part based on the rule of representation. The main and definitely dominant role in the work on a performance belongs to the director (often with a background in acting, arts or literature), who is responsible for interpretation of the text, whereas the other co-workers are supposed to illustrate his or her ideas by using images, sound or movement. Perhaps that is why the participants of the debate, which I have already quoted above, (apart from Ziemilski) have adopted an approach expressed in the most direct way by Bartek Macias, who defines his role in the following way:

... if one is only responsible for the media in a bigger venture, one is only a member of a bigger team. The last word belongs to the director who puts it all together. It is nice to be a part of it. ...

²⁷ Mateusz Borowski, Małgorzata Sugiera, "Konszachty z medialnością," *Didaskalia*, no. 107, 2012, p. 37.

During rehearsals I feel that I take a high position in the creative hierarchy. But there must be one person whose vision we want to come true – and I am really concerned about it.²⁸

The third cause is a delay in the field of theory. Media classes in the faculties of culture studies have been conducted for a dozen years and in the faculties of theatre studies for only a few years (if at all); addressing this issue in drama schools is still a complete novelty. In Poland, often the latest theatre trend is still set by the approach that “everything is theatre” (*Society of the Spectacle* by Guy Debord, published originally in 1967, in Poland in 1998, and then in 2006 in an extended version including the part titled *Reflections on the Society of the Spectacle*; the works of Victor Turner from the 1970s and 1980s were published in Poland in the first decade of the 21st century; the works of Samuel Weber are reaching Poland now, a few years belated), whereas in Western theatre studies the standard approach is “everything is a medium”²⁹.

In German theatre studies there is no opposition between theatre and the media, because the theatre itself is a medium, similarly to:

light, water, sand, warmth, stones, air, ... language, space and time”, because “only mediated relations exist – both with objects and with people ... Only what is transmitted by the media exists in the first place.”³⁰

No wonder that the new media are not treated in the German theatre as strangers or intruders who have come from the realm of technology to the world of “encountering a live human being” (as the theatre is still pretentiously called), but as one of the letters in the media alphabet which includes not only screens, cameras and motion sensors but also light, sound, images and the actors themselves.

After the pictorial and performative breakthroughs have been strongly perceived in the Polish humanities, the media breakthrough will probably occur soon. It will certainly have a huge impact on changes in the theatre which will not be able to escape from the simple fact that it is a medium itself.

Translated by Katarzyna Turska

²⁸ “Medium czy gadżet?..”, p. 49.

²⁹ See e.g. *Wörterbuch der Theaterpädagogik*, ed. by G. Koch, M. Streisand, Berlin 2003; Andreas Kotte, *Theaterwissenschaft*, Köln 2005.

³⁰ Knut Hickethier, *Einführung in die Medienwissenschaft*, Stuttgart 2003, p. 19.

Technology in creative practice and the performances of Polish contemporary dance artists

In the global space of technoculture, cultural and technological layers interpenetrate and mutually condition each other. During the last century, intense technological development has acted as a catalyst for cultural change, but there is also the opposite relation: new needs and cultural practices have determined the direction of development in new communications technologies. Therefore, according to Debra Benita Shaw, we can “describe the study of technoculture as an enquiry into the relationship between technology and culture and the expression of that relationship in patterns of social life, economic structures, politics, art, literature and popular culture.”¹

Artists are particularly active participants of culture, and hence of technoculture. One has to agree with Marshall McLuhan, the leading theoretician of media communication, when he states that artists have special competence in analysing and understanding contemporary cultural change.² They not only give their opinions on the subject, but make their art a space for practical testing of the latest models of functioning in culture. Contemporary artists discuss and examine models of cooperation of human and non-human (e.g. technological) agents. This relation is particularly discernible in the art of dance. The body in motion – a person equipped with senses that let him or her locate him or herself in the world – is the medium of dance art. Communications technologies constantly shape one’s ways of using the body and one’s perceptual-cognitive habits. The art of dance allows us to inspect how the body and technology co-mingle, to try out new connections, and to elaborate on the borders of cultural approval of change.

Involving technologies in creative practice and in performances is becoming a more and more common practice. Contemporary dance artists not only use electronic and digital tools, but also take over some mechanisms that allow them to transform the audience’s experiences developed in the area of new communications technologies.

¹ Debra Benita Shaw, *Technoculture: The Key Concepts*, Oxford–New York 2008, p. 4.

² Marshall McLuhan, *Understanding Media: The Extensions of Man*, New York 1964.

Parallel history

Along with the political and economic changes that took place after 1989, Poland joined the economic and cultural global system, and, as a consequence, Polish art underwent far-reaching transformations.

One should remember that all the way to the beginning of the 1990s the history of Polish contemporary dance was a kind of "parallel history." In the West, the cultural revolution of the 1960s, obviously correlated with the specific political and economic situation, was for Western societies a source of new paradigms of creativity and dance aesthetics. Poland landed in the Eastern area of influence, which indicated a peculiar situating of dance on the map of art disciplines. Joanna Leśniewska states as follows: "Soviet classical ballet became the only form of dance approved by communist authorities, and contemporary dance – the expression of the individuality and one of the most democratic arts – had no *raison d'être*."³

Dance critic Anna Królicza, in her book titled *Sztuka do odkrycia*⁴ (*Art to be discovered*), tries to periodise the development of contemporary dance in Poland after World War II. She points out that there are only some single "islands of creative freedom" on the post-war map of dance art: The Polish Dance Theatre of Conrad Drzewiecki, The Laboratory Theatre of Jerzy Grotowski and The Wojciech Misiuro Expression Theatre developed the activities we would nowadays call the physical theatre. According to the author, the most popular dance form in the 1990s was dance theatre, precisely the specific Polish variant of this form. A narrative character, spectacular nature, emotionalism and versatility of the subject are its characteristics; the move reflects the musical phrase and the dance technique is of special importance. The course of the development of dance theatre and more widely contemporary dance in Poland was critically judged by Joanna Leśniewska, critic and the Old Brewery New Dance programme's curator:

... the majority of teams are calling their art the dance theatre, quoting the already classical formula of Pina Bausch's theatre. But what we can see on the stage most often is an effect of a hazy idea about the stage form of *Tanztheater* ... It remains strongly emotional, kind of insensitive to the reality, eternally penetrating private feelings, talking continuously and with no distance about private, often infantile, trivial and naive experiences.⁵

Furthermore, the author compares the attitude of Polish contemporary dance artists to the one of young Europeans.

Chafing pathos, annoying seriousness, incomprehensible lack of a sense of humour – that's what drastically distinguishes our performances and the ones of foreign peers from the West. ...

³ Joanna Leśniewska, "Teatr tańca w Polsce," in *Słownik wiedzy o teatrze. Od tragedii antycznej do happeningu*, Bielsko-Biała 2007, p. 328.

⁴ Anna Królicza, *Sztuka do odkrycia. Szkice o polskim tańcu*, Tarnów 2011.

⁵ Joanna Leśniewska, "Czekając na Małyszka," *Didaskalia*, no. 75, 2006, p. 17.

European artists aren't afraid to take the risk of facing up to the present; they uncompromisingly push their visions through, without any complexes take the risk of seeking their own, original language; they don't remain indifferent to the surrounding reality and dare to comment, protest and take a stance.⁶

Those words were written eight years ago, and since then things have changed quite a great deal.

The first decade of the 21st century brought a new way of thinking about the language of dance. Choreographers walked away from the language of the dance theatre that was popular in the 1990s and adopted brand-new creative strategies. They sought new forms of expression and tried to renegotiate the stage situation. And, above all, they started commenting on the deep cultural change of everyday practices.

Artists performing solo, playing the role of choreographers and dancers at the same time, as well as artistic collectives carrying out interdisciplinary projects, are the main initiators of experimental actions. In the majority of cases they belong to the young and the youngest generations of artists; they acquired dance and choreographic experience at foreign artistic colleges and during the coaching sessions of the Alternative Dance Academy project by Old Brewery New Dance. The new idiom is being described by dance critics (A. Królicza, W. Mrozek, J. Majewska) as "the new dance," and artists as "the solo generation"⁷ – young independent artists are usually ex-residents of the Solo Project, or their peers.

In the last quarter of the 20th century, Polish contemporary dance has "caught up with fifty-year-old arrears,"⁸ stated Leśnierowska. The younger generation has to acquire in a nutshell all the paradigms of creation that have appeared on the European and American scene of dance since the end of World War II: minimal, abstract, postmodern, physical, conceptual and critical dance.⁹ Young artists willingly use the languages of different media: not only of dance and theatre, but also of the visual arts, performance art and, last but not least, of new media arts.

Technologies for dance

In order to situate the activities of Polish contemporary dance artists on the map of global technocultural practice, it is worthwhile to point out some crucial intersections of development of the dancing body and technology moments.

⁶ Ibid.

⁷ E.g. *Pokolenie solo. Choreografowie w rozmowach z Anną Króliczą*, Kraków 2013; *Nowy taniec. Rewolucje ciała*, ed. by W. Mrozek, Warszawa 2012; Jadwiga Majewska, *The Body Revolving the Stage. New Dance in New Poland*, Warszawa 2012.

⁸ Leśnierowska, "Czekając na Małysza," p. 17.

⁹ E.g. Nancy Reynolds, Malcolm McCormick, *No Fixed Points: Dance in the Twentieth Century*, Yale 2003, or in Polish: Wojciech Klimczyk, *Wizjonerzy ciała. Panorama współczesnego teatru tańca*, Kraków 2010.

Since the 1960s the art of dance has become more and more tightly intertwined with technology. In the second half of the 20th century a new artistic-scientific movement was born in the USA: the collectives of artists and engineers examined the possibilities of utilising new technological achievements in the performing arts, and especially in dance pieces. At the same time a new ethos turned up. The creative paradigm embracing participatory and conceptual art as well as the DIY (do-it-yourself) ethic were of significant importance to forming the idea of technologically enriched dance and its practical implementation into the performance.

In 1966, on the initiative of engineers Billy Klüver and Fred Waldhauer and the artists Robert Rauschenberg and Robert Whitman, there came into being a non-profit organisation called Experiments in Art and Technology (EAT). The same year a series of performances entitled *9 Evenings: Theatre and Engineering* were presented. The event united engineers and artists working on the new technologies. Among them were choreographer-dancers representing postmodern dance (Deborah Hay, Lucinda Childs, Yvonne Rainer) who were interested in merging the new technologies with the art of dance. The artists cooperated closely with the engineers planning their actions, and this was based on implementing different appliances and technologies into the stage performance. To give some examples: Childs used the Doppler sonar in her *Vehicle*, "[t]he data were processed in order to generate the desired weave of sounds and to adjust the light sources."¹⁰ Hay utilised eight radio-controlled carts acting as movable podiums in *Solo*,¹¹ and Rainer made use of walkie-talkie devices to generate the choreographic score in real time in *Carriage Discreteness*.¹² All of the artists were using many technologically advanced tools that allowed them to remotely control sound, lighting and the projections.

In 1967 the Portapak camcorder was released by Sony Corporation. From this moment on video art began to develop. In the field of dance, recording cameras were used not only to record and archive dance performances, but also to extend the boundaries of dance and to carry out research on movement dynamics. Later, digital technologies enriched the dance-for-camera field and contributed to the development of a new discipline – the screen-dance. On the other hand, the stage performance itself was being extended with the use of screen projections, projections on stage sets, clothes or the body of the performing artist (e.g. *Telematic Dress* by Susan Kozel).

In the 1990s, artists included into the range of their practice some tools allowing them to track and record movement to convert it into disembodied visualisations. The first experimenters in the field of using motion capture in the art of dance were Merce Cunningham (*LifeForms*; *BIPED*) and Bill T. Jones (*Ghostcatching*). Choreographers involved in establishing cooperation with experimental studios (e.g. Interactive Creed or Riverbed) developed new technologies that allowed them to animate digitally created figures. Although these tools allowed to choreograph physically impossible movements, they did not

¹⁰ <http://www.fondation-langlois.org/html/e/page.php?NumPage=1734> [accessed: 2 December 2014]

¹¹ <http://www.fondation-langlois.org/html/e/page.php?NumPage=1773> [accessed: 2 December 2014]

¹² <http://www.fondation-langlois.org/html/e/page.php?NumPage=626> [accessed: 2 December 2014]

enable real-time interaction of the performing artist with his or her “dancing avatar.” Since the end of the 1980s, many programmes and platforms were created allowing for real-time processing of data derived from the dancer’s movements. The visualisations and sound effects constituted a basis for further interactions held in a feedback loop, and also for performances based on telematic co-presence. Among these tools were Marc Coniglio’s Troika Ranch software (MidiDancer, 1989; Isadora, 2004), and the most popular was Kinect (2010), a device released by Microsoft Corporation as an addition to the Xbox 360 console. It is a laser sensor emitting infrared rays with a built-in camera and microphones.¹³

Interactivity¹⁴ appears to be a turning point for the dramaturgy of a dance performance. The interactive paradigm relates not only to the performers’ actions, but also to the way of involving spectators. Johannes Birringer, a researcher working in the field of digital performance theory, distinguished four types of environments to be met in digital dance stage productions. “(1) interactive environments (based on sensors and motion tracking); (2) derived environments (motion capture-based reanimations of bodily movement or liquid architecture, which can also be networked and reintroduced into live telepresence or telerobotic operations and communications between remote sites); (3) immersive environments (Virtual Reality based, such as the *Cave* or panoramic installations – similar to *T-Garden* – that integrate the body, with stereoscopic devices in front of the eyes, into the polysensual illusion of moving through space); and (4) networked environments (telepresence, videoconferencing, and telerobotics, allowing users to experience a dispersed body and to interact with traces of other remote bodies, avatars, and prostheses).¹⁵ An example of the interactive environment is *Very Nervous System* by Rockyby, of the derived one – *BIPED* and *Ghostcatching*, of the networked one – *Telematic Dreaming* by Paul Sermon, and of the immersive one – *Osmose* by Charlotte Davis or *Virtual Dervish* by Diane Gromala and Yacov Sharir.

In order to place the activities of Polish contemporary dance artists in the space of technoculture, one should consider both the wider context of global cultural change and local historical and economic conditions.

To put the creative concept into practice, artists select specific tools and obtain access to a particular laboratory or stage infrastructure. In many Western academic and artistic institutes and centres there exist the so-called “intelligent stages”¹⁶ and studios equipped with appropriate devices allowing artistic concepts to go through consecutive phases of experiments, rehearsals and, finally, production. And, actually, Birringer describes this age as the age of laboratories. “Artists work in art labs and have residencies

¹³ More on this subject see Michał Krawczak, “Programowanie interakcji: software i sztuki performatywne,” *Didaskalia*, no. 112, 2012, pp. 111–115.

¹⁴ I mean explicit interactivity; this term is explained in: Eric Zimmerman, “Narrative, Interactivity, Play, and Games: Four Naughty Concepts in Need of Discipline,” in *First Person: New Media as Story, Performance, and Game*, ed. by N. Wardrip-Fruin, P. Harrigan, Cambridge, 2004, pp. 154–163.

¹⁵ Johannes Birringer, “Dance and Interactivity,” *Dance Research Journal*, vol. 35/36 (2), 2003, p. 96.

¹⁶ “Intelligent Stage” by John D. Mitchell [online], available from: <http://www.intelligentstage.com>; <http://www.ephemeral-efforts.com/istage/index.html> [accessed: 13 March 2014].

in science labs, scientists increasingly join artists in collaborative «Research and Development» projects, and universities desperately try to merge the disciplines or create trans-disciplinary research centres and digital learning environments.¹⁷ Unfortunately, this tendency is developing very slowly in Poland.

The experimental practices of Western choreographers collaborating with new-media authors are a strong inspiration for Polish dance artists (which they express in their statements¹⁸); however, the selection of artistic tools is influenced by many independent factors, e.g. limitations associated with small budgets allocated to the projects of independent dance artists and the lack of institutional interdisciplinary initiatives carried out at the intersection of art, science and technology. Due to the lack of an adequate infrastructure and financial sources, artists interested in advanced technology designated for stage performances quite often rely on their own funds. Besides, networked and immersive environments are very demanding technologically (broadband Internet, etc.) and require large expenses, therefore, Polish artists are currently at the starting point of experimenting with such spaces.

In spite of the problems recalled here, many choreographers and dance collectives have implemented new tools in their performances. Among artists using new technologies on the stage are Tomasz Bazan (Maat Project), Bretoncaffe Theatre Barbara Bujakowska, Izabela Chlewińska, Joanna Czajkowska, Rafał Dziemidok, Good Girl Killer, Harakiri Farmers (Dominika Knapik and Wojciech Klimczyk), Wojciech Kaproń, Kaya Kołodziejczyk (U/LOI), Joanna Leśniewska, Patryk Lichota, Irena Lipińska, Kacper Lipiński, Mikołaj Mikołajczyk, Ramona Nagabczyńska, Anna Nowicka, Iwona Olszowska, Janusz Orlik, Aleksandra Osowicz, Renata Piotrowska, Magdalena Przybysz, Iza Szostak, Teatr Dada von Bzdülów, Rafał Urbacki, Anita Wach and Marta Ziółek.

When analysing the artistic practices of the authors listed above one may indicate a few basic models of using the technology in the space of the dance performance.¹⁹ On account of the diagnosed obstacles of an institutional and financial nature, the advanced interactive environments analysed by Birringer are not common in the practice of Polish dance artists. That is why the most popular technology to be used in Polish dance performances are audio-visual projections.

Artists have adopted several strategies. Some of them use artistic films as digital stage design. The visual or audiovisual projection does not influence the dancer's performance, and implicates neither a body-technology splice nor play with the new perceptual-cognitive habits of the audience associated with the development of communications technologies. Dance and visual artists usually create the performance together, working at the same time on the choreography and the visuals. The projections might be prepared beforehand, and the

¹⁷ Johannes H. Birringer, *Performance, Technology & Science*, New York 2008, p. XXIV.

¹⁸ *Pokolenie solo. Choreografowie w rozmowach z Anną Królicą*, ed. A. Królicą, Kraków 2013.

¹⁹ Research grant *Multimedialność: strategie wykorzystywania nowych mediów (elektronicznych, cyfrowych) w polskim nowym tańcu* [Multimediality: strategies for using the new media (electronic, digital) in Polish new dance] (Institute of Music and Dance, Warsaw, 1 October 2013 – 30 June 2014).

movement score might already be choreographed (e.g. *Cosmos* by Kaproń; *I WANNA BE SOMEONE GREAT* by Harakiri Farmers). Although performances of this kind have a bi-linear narration (of the body and of the visuals), they give the audience a feeling of multimedia, of cohesive narration. Sometimes, choreographers prepare both the movement score and the visuals. In *Tralfamadoria* by Chlewińska, screen-projected graphics and texts are created in the course of the performance and act as a partner of the dialogue; her performance is based on the aesthetic potential of the moving body and the real-time interactions of the body and the image. The audio-visual projection may also play an important role in the performance's dramaturgy. In *3D-ance* by Bujakowska it helps to de- and re-construct the process of the choreographic score creation by letting the dancer interact with herself in various phases of the creative process; for example, in *Whatever* by Tomasz Bazan, the projection builds up the meta-discursive context for a bodily-based performance.

The majority of research projects in the field of dance&technology are dedicated to an analysis of their visual aspect. However, in many contemporary dance pieces choreographers and dancers collaborate with composers interested in computer-based sound, usually musicians creating minimal, electro-acoustic and generative music whose instruments are computers equipped with the appropriate software (e.g. *Dance For The Birds, They Watching Us* by Przybysz&Maingardt). The musician and multimedia artist Patryk Lichota in the *AUDFIT* performance attempts to generate sound out of the dancer's (Marta Romaszkan) moves. The numerical value of the move's vector is measured in three axes, and the received data are converted into sound. Audience members listen to the music by using headphones equipped with buttons. They get the chance to choose between three channels playing different music.

There have also been some attempts to experiment with real-time technologies. Choreographers cooperate with new media artists on phases of conception and realisation of performances to find new strategies involving the dancers in bodily and technological performances. Artists use devices that let them track the moving bodies and to convert in real time all of the collected data into sound and image.

Artists design visual and aural feedback loops. They use popular devices, e.g. Wii Remote controllers (*IGROT!* by Lipińska/Janicki/Zamorska) or the Kinect motion controller (*frictionmakesfrictionmakers* by Osowicz/Parlato/K.-H. /Makarov), but also home-made technical equipment consisting of digital cameras and microphones mounted on the body (*Strange Lóóp* by Lichota/Romaszkan/Przybysz). In these cases the technology "choreographs" the movement of the dancers, so one may attribute to it the choreographic agency.

Dance as the meta-discourse of technoculture

To analyse and interpret contemporary dance in the context of cultural change, the researcher should use categories developed in the field of media studies. Of course, transcription of the language of new media into the language of new dance must be meta-

phorical in many respects. The art of dance is multi-layered and surely cannot be represented numerically; it does not exist as data. But other principles formulated by Lev Manovich in his book *The Language of New Media*²⁰ might easily be referred to in the art projects of contemporary dance artists; for example, modularity appears in contemporary dance performances in the form of repetitions, transformations and iterations that have become one of the most important choreographic strategies since postmodern dance. The theme of a modular structure is being explored by Bujakowska&Janus in their performances *Movement Modular Synthesis and 3D-ance*. Modularity is associated with automation; the choreographic scores are sometimes built out of many modules (e.g. the choreographic structures of Merce Cunningham) and the interrelation of the parts is being modified automatically as a consequence of an accidental impulse that triggers the process of structure organising. Made Inc group (Edyta Kozak and Mirek Kowalczyk) in *Plik 01* experimented with automation: the audience used a computer to choose the visual, aural and movement modules and the software automatically mixed them into a coherent intermedia dance piece. The notion of variability refers to the fact of the existence of media objects in various versions. Similarly, contemporary dance pieces obtain a few different versions depending on the space (theatre, art gallery or public space). And, finally, transcoding refers to the assumption that because culture and technology function in constant feedback, culture is suffused with the ubiquitous logic of the computer. This is what we are observing in the contemporary art of dance! In his later works Manovich proposed the idea of post-media aesthetics. Its characteristics are the specific manner of data ordering and adopting the "new concepts, metaphors and operations of a computer and network era." Its categories "should not be tied to any particular storage or communication media."²¹

Contemporary dance exists in technoculture. When analysing the issue we have to consider not only how artists apply new technologies, but also how they refer to – on levels of structure, form, dramaturgy and narration of the dance performance – the presence of technology in everyday life. The art of dance functions in a technocultural reality and, in the process, reflects the trajectory of cultural transformations. Artists comment on the transfigurations of the body-technology relation with their practice: they create the multimedia and interactive performances, refer to the matter at the level of narrative and composition, and adopt some audience engagement strategies from the mass-media, video games, and the Internet. New techniques of the body and new perceptual-cognitive competences of the spectators using communications technologies in everyday life are being reflected in the concept, structure and dramaturgy of dance performances. Meta-discursiveness in the contemporary art of dance is not limited to the art of dance, but embraces the culture as a whole.

In contemporary dance performances, the paradigm of interactivity plays a huge role. Its sources are open and participatory, just like the art of the 1960s and 1970s. Perfor-

²⁰ Lev Manovich, *The Language of New Media*, Cambridge, Mass., 2001.

²¹ Lev Manovich, "Post-media Aesthetics" [online], 2001, available from: http://manovich.net/content/04-projects/030-post-media-aesthetics/29_article_2001.pdf [accessed: 8 December 2014].

mance art, happenings and conceptual art have dematerialised a work of art. In the same period the concept of the "open text" as proposed by Umberto Eco gained popularity, especially his ideas of shared authorship and the agency of the recipient/audience. At the turn of the 20th and 21st centuries, interactivity became the standard for the computer and for mobile devices with a tactile screen or another interactive interface. Navigation replaced narration. The spectator stopped being the spectator, i.e. the one who "is watching," instead, he or she gained the possibility of actively contributing to the artistic event. Contemporary artists let spectators choose the path to follow while creating their own version of the event they were participating in. This strategy has also been adopted by Polish artists. In the already mentioned *AUDFIT* performance, the soundtrack arises in real time, i.e. the movement of the dancer is read by the tracking system (nine sensors and the broadcasting station), then converted into sound and sent to receivers with a switch. The spectator chooses one of the three channels – the sound space suiting him or her the most with the preferred kind of affective excitement.

Immersive penetration into an artificially designed space replaces the former relation of distance. Also, dance performances become a space of the co-presence of authors (or designers) and spectators (or users). This model is used, for example, in *Unknown #1, #2 and #3* by Towarzystwo Prze-Twórcze. Spectators, with their eyes covered, are led into the space of the performance. The deprivation of eyesight and activation of the other senses such as touch and proprioception let the spectators, so accustomed to perceiving the performance from a distance, "become" the dancers. In the second phase the audience "gets" their eyesight back and becomes a part of the multimedia performance, which is based on bodily performance and projection mapping.

Another consequence of popularising communications technologies is the appearance of a new formula of the creative process, i.e. collaborative, interdisciplinary creation, also called "devising." The computer and telematic art have developed since the 1960s.²² The strong ethos of self-sufficiency and self-reliance accompanied the creative process and presented a social move initiated by the idea of "the third culture" (1995).²³ The platform for a cross-disciplinary exchange of thoughts was created and all the processes based on a synergy effect gained great support. Digital art developed very quickly with the help of scientists and engineers.

Polish contemporary dance performances are these days more and more often created by collectives working on one-time art projects, drawing on shared, dispersed authorship. In interdisciplinary teams (choreographers, dancers, new media artists, composers of generative or electro-acoustic music, dramaturgists as well as engineers or scientists, etc.), artists share their competences in different fields, collaborating above the concept of the entire dance event. We observe the disappearance of the hierarchisation that is char-

²² Ewa Wójtowicz, *Net art*, Kraków 2008, pp. 165–178.

²³ John Brockman, *The Third Culture: Beyond the Scientific Revolution*, New York 1995.

acteristic of the dance theatre, in which the choreographer played the leading role, the dancers were the contractors, and the designers of light or sound were the technical assistants.

Contemporary dance productions adopt new strategies, such as transmedia storytelling, remix, and postproduction.²⁴ The first of the terms, defined by Henry Jenkins²⁵, denotes a single story told across many platforms, where each of them contributes in a different way to its creation. The multiple narration format is also being exploited by contemporary dance artists. Performance is no longer an autonomous stage event, but instead becomes an element of a more widely comprehended "project." It becomes the element of the larger whole. Websites of events containing films, trailers, teasers, GIFs, and other elements are often as important as the stage performance (e.g. *Strange Lóóp*, strangeloop.pl; *!GROT!*, grotproject.pl).

Remix is another term essential for understanding contemporary art. Manovich, who introduced the notion of deep remixability, claims that designers "remix not only the content of different media, but also their fundamental techniques, working methods, and ways of representation and expression."²⁶ In our times not only artists, but also the curators of performing arts are interested in remixability of the arts. For example, the Polish artistic group Komuna//Warszawa produced the *RE//MIX* cycle "which resulted in the creation of over 30 premieres that reference classic works of avant-garde in theatre and dance, as well as music, literature and film."²⁷ The majority of the invited artists were Polish contemporary dance artists. Curators decided to use the expression "remix" rather than other terms that more often turn up in this context, such as re-enactment or reconstruction. Remix:

... stands for a piece created as a result of transformation of another piece. It is not simply an "interpretation", which reproduces the original through other means or in another arrangement. Although it may retain from the original some fragments (samples), they are merely quotations. A remix is a new piece, referencing in its content or form the original. The authors of the remixes enter into dialogue with their masters, present nostalgic recollections or new readings of their work.²⁸

This term, perfectly describing some of the contemporary choreographic practices, was also adopted by Anna Królika, the curator of the *Archive of the Body* project.²⁹

²⁴ Ewa Wójtowicz, "Twórca jako postproducent – między postmedialnym remiksem a reprogramowaniem kultury," in *Remiks. Teorie i praktyki*, ed. by M. Gulik, P. Kaucz, L. Onak, Kraków 2011, pp. 14–28.

²⁵ Henry Jenkins, *Convergence Culture: Where Old and New Media Collide*, New York 2006.

²⁶ Lev Manovich, "Software Takes Command," version 20 November 2008, p. 25.

²⁷ Komuna//Warszawa homepage, <http://komuna.warszawa.pl/komunawarszawa-communewarsaw/> [accessed: 7 December 2014].

²⁸ *RE//MIX* cycle at Komuna//Warszawa homepage, <http://komuna.warszawa.pl/1998/12/12/re-mix-cycle-20102011/> [accessed: 7 December 2014].

²⁹ Zamek Culture Centre in Poznań, September-December 2013, <http://www.zamek.poznan.pl/sub,en,343,archive-of-the-body.html> [accessed: 7 December 2014].

Another important point of reference is the category of postproduction applied by Nicholas Bourriaud.³⁰ According to this critic and curator of contemporary art, most participants of mediatised culture create and produce contents of a different kind; the artist plays the exceptional role of postproducer. This kind of task division is also quite common in contemporary dance. Artists commit themselves to community-based projects. Its participants are the creators of the dance performance (i.e. the artists), and the choreographers as postproducers care about the ultimate shape of the event. In Poland in the last decade there were many projects of this kind involving persons with an alternative motricity, ruled out on account of their economic situation or age, or simply in a specific or peculiar social situation (e.g. *W przechlapanem* by Rafał Urbacki, *MaMa Perform* by Maria Stokłosa or *Teraz jest czas* by Mikołaj Mikołajczyk).

Polish contemporary dance artists examine the couplings of humans with the technologies of everyday life. Artists test new tools and allow the technology to determine the course of the dance performance. Creative application of computer technologies to dance art is currently being examined and widely discussed. Many theoreticians have dedicated their studies to dance-media performance, have augmented dance, digital dance and cyberdance;³¹ but the body-technology relation in contemporary dance is a much wider issue, and the use of electronic and digital tools in the performance is only one of its aspects. Technological development influences the techniques of the body and perceptual-cognitive habits, and at the same time shapes new creative paradigms and artistic currents. Interest in communications technologies becomes apparent not only in ways of using the new technologies, in engaging the audience, but also in the phase of creative practice. In Poland, we are still lacking research projects devoted to the subject. The issues discussed in this chapter require a wider debate in the field of Polish art theory.

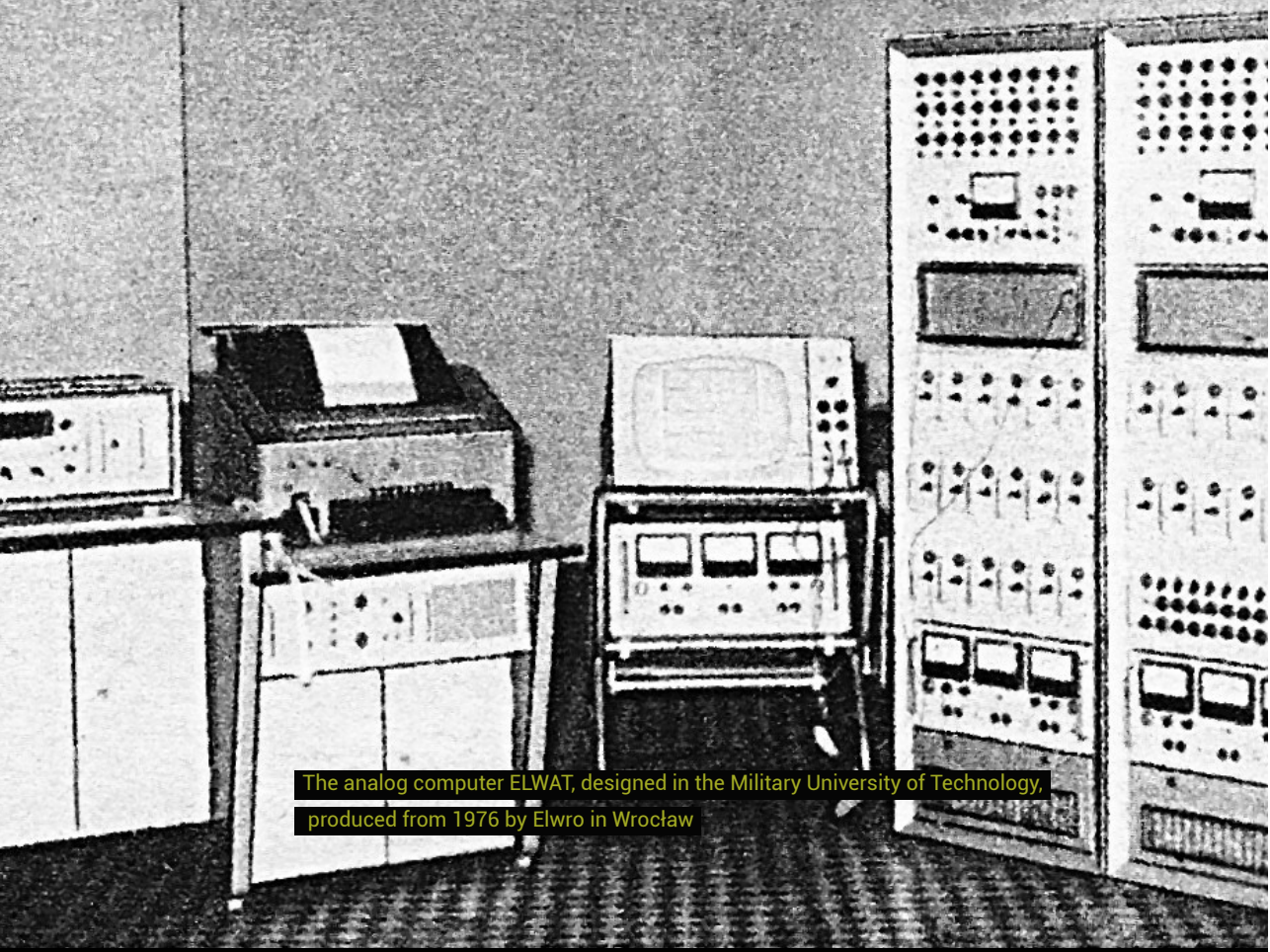
³⁰ Nicolas Bourriaud, *Postproduction: Culture as Screenplay: How Art Reprograms the World*, transl. by J. Hermann, New York 2002.

³¹ E.g. Verena Anker, *Digital Dance. The Effects of Interaction between New Technologies and Dance Performance*, Saarbrücken 2010; Steve Dixon, Barry Smith, *Digital performance. A history of new media in theater, dance, performance art, and installation*, Cambridge 2007; Zeynep Gündüz, *Digital Dance: (Dis)entangling Human and Technology*, Amsterdam 2012; S. Portanova, *Moving without a body. Digital philosophy and choreographic thoughts*, Cambridge 2013.

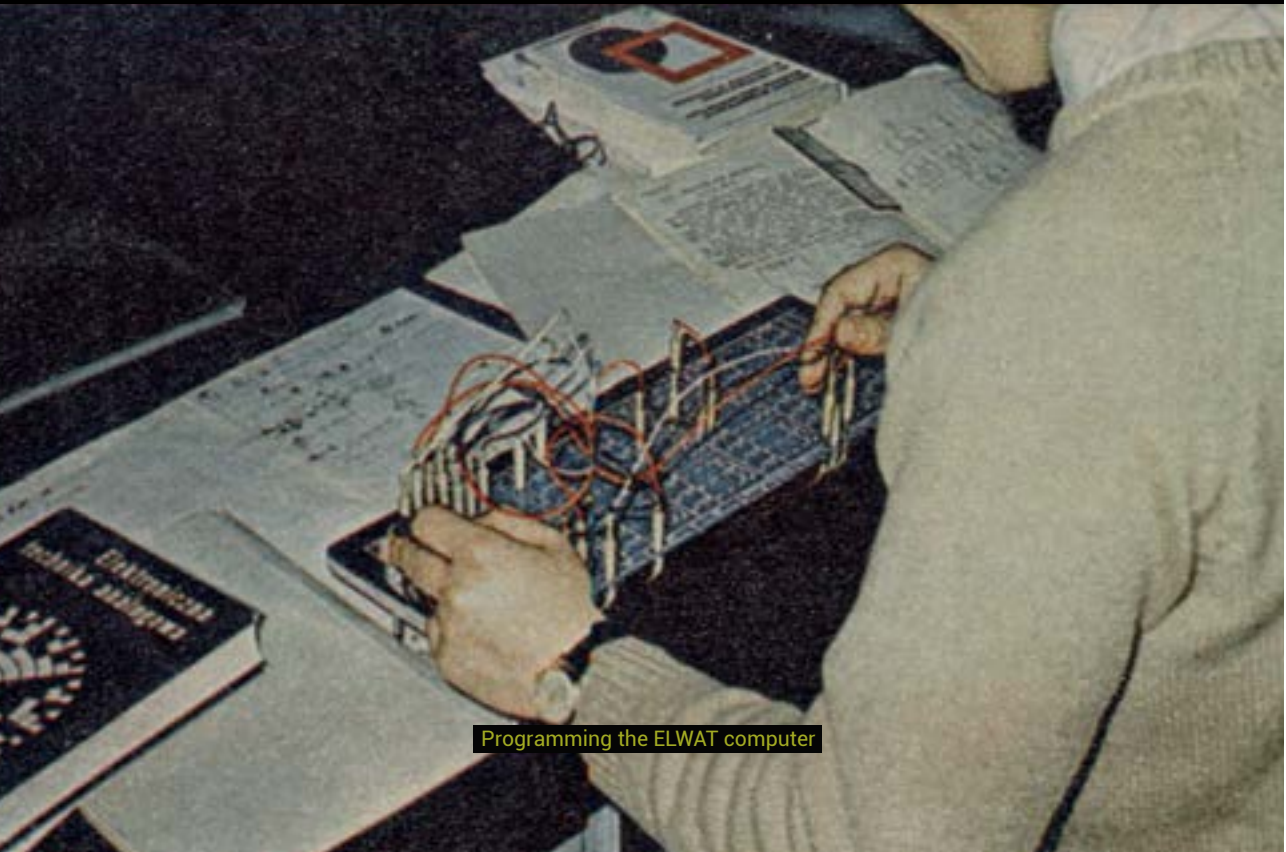


Miecze Valdgira, Polish computer game, 1991





The analog computer ELWAT, designed in the Military University of Technology, produced from 1976 by Elwro in Wrocław



Programming the ELWAT computer

Polish computer games of the 1990s: The chao-aesthetisation perspective

I assume the perspective of chao-aesthetisation in order to define the impact of Polish computer games on their users. I address the experience of technically programmed users which introduces different modalities of experience in general. The perspective I adopt in the text arises from the ideas put forth by Gilles Deleuze, Félix Guattari¹ and Wojciech Chyła. Deleuze and Guattari point out that the technological level of art is contained in the aesthetic element, while the aesthetic plane extends to the chaosmos, or a reality of infinite velocities² which is juxtaposed with the material and slow world. To my mind, at present this relation is reversed and the chaosmos, which art has partially harnessed and furnished with a stable form in a work set in motion by the recipient's senses, currently programmes the recipient's impressions and affections, thus aestheticising his or her experience. The subject no longer traverses infinite velocities via his or her action, carving out of those velocities blocks of impressions; instead, the programming of experience makes these technically created blocks of impressions construct the ephemeral subject. The chaosmos, introduced into culture by technology, is far more represented in culture than envisaged by Deleuze and Guattari, who did not consider the ontological status of technology. Wojciech Chyła believes that a techno-connectionist event (an event arising from a merger of technical data) provokes the artificial sublime and hence there is no more need for a tangible work of art, let alone for the subject's ability to represent one.³ To my mind, the sublime need not arise, at least not each and every time. Therefore, I opt for treating technically programmed aesthetic objects (in particular computer games and

¹ I refer in particular to the ideas put forward in the texts by Gilles Deleuze, *Różnica i powtórzenie*, transl. by B. Banasiak, K. Matuszewski, Warszawa 1997; Gilles Deleuze, Félix Guattari, *Co to jest filozofia?*, transl. by P. Pieniążek, Gdańsk 2000; Félix Guattari, *Chaosmosis: an Ethico-Aesthetic Paradigm*, transl. by P. Bains, J. Pefanis, Bloomington–Indianapolis 1995; Wojciech Chyła, *Media jako biotechnosystem. Zarys filozofii mediów*, Poznań 2008.

² The idea put forth in the book titled: *Co to jest filozofia?*

³ Wojciech Chyła, "Technokoneksjonistyczne 'zdarzenie' jako źródło 'sztucznej wzniosłości' i 'sztucznej nieskończoności,'" *Sztuka i Filozofia*, no. 41, 2012.

other interactive media) as provoking chao-aesthetisation in the user, or the introduction of multiple aesthetic effects; they acquire coherence neither in the subject-object relation nor in a tangible work of art.

Chao-aesthetisation refers to methods of aesthetics of the chaos of the chaosmos, or attributing value and qualifying as aesthetic technical data not on the basis of relevant powers of judgment but an emotional attitude via opinion interfaces and data transfer. Therefore the fundamental pattern of chao-aesthetisation is a remix implemented in an infinite number of ways.⁴

Technology triggers an aesthetic experience or makes an object chao-aesthetic, i.e. capable of manipulating the sensitivity of the recipient and involving the latter in its world, which strips the recipient of a centre of reference or creates new reception modalities. The user's immersion into the world of computer games is caused by chao-aesthetisation; the user is incorporated into a world and made to operate within it. This user is not an autonomous subject capable of making aesthetic judgments, but in the course of operating in the immersive game world he or she experiences many contradictory affections in short series. Therefore, chao-aesthetisation occurs in an artificial infinity. It need not refer to anything present and thus rejects the classic definition of subject and object, thus transferring it into the technological system. This is how we should understand immersion: as an effect of chao-aesthetisation rather than a spontaneous entry of the player into the interactive world of computer software. Programmed experience is simultaneously aestheticised chaotically, i.e. is subject to the process of chao-aesthetisation. The subject becomes a point traversed by all kinds of technical programmes. The subject does not impose the order of receiving impressions but moves within this chaos of impressions, affectations and interactivity.⁵ The chaos of the chaosmos is the infinity of interaction, the artificial infinity.⁶

The experience of computer games is aesthetic in itself. The user does not negotiate interpretation but only the intensity of impressions through interactive references to the immersive world of games. Polish games created in the 1990s contained a kind of desirable chao-aesthetisation experience since immersion in the game world enabled users to discover an agency beyond the systems of thinking and experience marked by the limitations of a world which was not technologically mediated. In this sense, chao-aesthetisation is the release of chaos, the liberation of the subject and object from interpretations that stabilise reality. Therefore, this does not mean a lack of ordering the aesthetically programmed experience but indicates a novelty arising from the diversity of computer games and from the complex relations between them and the user.

⁴ A modified quote after: Rafał Ilnicki, "Chaosmos – od paradygmatu etyczno-estetycznego do chaoestetyzacji wysypisk danych biotechnosystemu," *Sztuka i Filozofia*, no. 41, 2012, p. 171.

⁵ This contributes to the fact that the user receives particular phenomena aesthetically or as a form of subjectively understood art.

⁶ This is a notion proposed by Mario Costa and applied by Wojciech Chyła to define the lack of limits of a technologically programmed aesthetic experience.

Streams of audiovisual data intersect in the user, so that he or she loses control over what is seen and heard and becomes absent, only to emerge already with a memory of the world he or she was immersed in during the game. The chaos of the market of audiovisual objects gives rise to many games which trigger divergent aesthetic effects and make the player adopt divergent reception strategies. Multiplicity shifts towards chaos, which aestheticises experience. This is also a novelty – each new velocity, even if it means slowing down – is a kind of destabilisation for the recipient and getting unplugged from daily existence even if a computer game concerns its interpretation. At the same time, particular layers of experiencing computer games wreak chaos different than any other, which presents the player with ever new challenges of interaction in the immersive environment of computer games. We are not dealing with the users' preferences of particular orders of reception but with a selection of layers of chaos that make up the chaosmos of contemporary technologically-mediated culture. The very contact with a game aestheticises experience and introduces aesthetic patterns which are the foundations of the player's dispositions to perception.

Therefore, with reference to chaos-aesthetisation we can say that there is no computer game, but computer games. They operate as an irreducible multiplicity. Computer games are a multiplicity and thus chaos since they do not agree on experience and cannot be reduced to one reception mode. There is neither a single universal culture of computer games nor a unitary model of the experience it introduces. They are such diversified phenomena that determining their kinds and manners of impact calls for a correspondingly complex introduction which would indicate the different modalities of chaos-aesthetisation, i.e. the source experience of programming the reception aesthetics of computer games.

The player is in a bio-techno-system which I call a technologically-managed chaosmos,⁷ or a plane of infinite velocities which enter culture and accelerate its action. Technology alone is enough to aestheticise the experience of the user; the player's intention is only partly present as a memory of the world located outside the immersive world of computer games. It depends on the interactive ways of expression of the user's being; the player acting in the game world aestheticises his or her experience with it since he or she introduces, instead of his or her own memory data, the audiovisual data making up a particular technological programme. The experience of computer games is rarely linked with contemplations, but rather with interactive interaction into the game world, which is chaos-aesthetisation, or the triggering of a sensation in the player that he or she is in some external space. At the same time, it exists in the immersive environment of computer games. This multiplicity of reception and influence strategies makes chaos-aesthetisation a process rife with contradictions, and therefore it dynamically introduces paradoxical elements into the experience of the user's state of being. The democratisation of computer games in the 1990s consisted in the fact that nearly everyone was able to create a com-

⁷ See Ilnicki, *op. cit.*

puter game, or to transfer his or her experience of the world onto other users, thus programming experience in their reception. In this sense, chao-aesthetisation, by introducing multiple paradoxes, obliterates the possibility of any totality since the users-players are incessantly confronted with the multiplicity of computer games.

Chao-aesthetisation consists in the multiplicity of games which programme the experience of the user without introducing any stable picture of the world but questioning it when turning on another computer game. Thus, chao-aesthetisation creates a field that is possible after the emergence of an art dependent on the user's subjective preferences, with no theoretical and institutional validity. I reject this perspective showing that chao-aesthetisation takes place in the currency of reception, which may take place not only during the direct experience of a computer game but may aestheticise experience via programming the recipient's disposition of perception and memory. Therefore, although oftentimes there is no direct link between computer games from the early 1990s and Polish interactive art, surely computer games contributed to the democratisation of the algorithmic approach to the design of aesthetic experience since these games, being the experience of the generation, enabled different forms of audiovisual creation. In this sense they are the chaotic foundation of successive realisations within interactive art. The impact of computer games is chaotic. It is not linked to the subject who looks at a work of art but it is chao-aesthetisation, which modulates the experience of the users by opening in them new connections in the technologically-managed chaosmos.

The impact of computer games consists, among other things, in the aesthetic programming of experience, or the insertion into the subject's perception and memory of technical data which trigger the aesthetic experience. The game itself is linked with the player's experiences, his or her knowledge and culture context, and that is why insight contributing to its description should also comprise the above fields. Computer games constitute the experience-interpretation given in this programming. The player is limited by the environment created for him or her, but at the same time operating within this environment is a form of freedom – a reference to the world as it is. The player may also transfer his or her experience beyond the game, commenting on it, talking with others – and then it becomes their shared experience. This was of paramount importance to computer games created in Poland in the 1990s, as this was a special time, following the collapse of communism, which called for a revision of the fundamental ways of operation of culture. Computer games were one of the major media for expressing the newly regained freedom, expressed in the abolition of censorship.⁸

⁸ At that time there were no age restrictions and institutions monitoring the amount of violence. This made it possible to create games such as *Franko: The Crazy Revenge* (1994). The extreme level of violence was a commentary on Polish post-communist reality. In this sense, the residential districts in ruins, the poverty and aggressiveness reflect the new reality, and the authors probably patterned them as *beat up* games after pinball. The popularity of the game can be attributed, moreover, to the frustration of the times following the change of the political system, which introduced freedom from censorship; the more violence and the more ruthless the protagonists the better, since those were the signs of democratisation.

Because computer games in a way triggered an aesthetic experience more than the other media,⁹ this fact was intuitively taken advantage of by their authors. It was important at that time that the studios of game authors were composed of several people and thus the vision of what was to be transmitted could be controlled. The recipient-player had at his or her disposal not so much a game as a product but a game as a vision of reality. Aesthetic phenomena were programmed for players, which they frequently saw as the immersive character of the game. They were able to become immersed in the game world, which was at the same time the world of the game's authors. Sharing experience took place between absent subjects within the medium of the game itself. This was a new situation in culture: users interacting with both a technical medium of the computer game and with the intention of the designers of the game. The difference between non-interactive media consists in the fact that the human being shares his or her experience with a machine and may interpret it in a purely human way, thus regarding a computer game as an account of others' experience. This triggers a completely new psychological situation which calls for a philosophical interpretation. However, the game itself triggers neither purely psychological nor philosophic effects, and thus an attempt at comprehending its cultural operation necessitates comprehension of the chaotic experience. We cannot say which level of experience, mediated or not, should be regarded as binding in the perspective of the psychological and philosophical analysis. The affinities between the experience of players and that of the authors of games, despite its being mediated by technology, had some immediacy. It arose from the programming of experience, which was aesthetic and imposed on the players ready perception patterns. These patterns became the perspectives they applied to look at the world. Therefore, computer games should be seen in the perspective of programmable aesthetic phenomena which may further be used by the players to interpret reality, as they need not be limited solely to the game world. Disregarding the significant impact of games reduced them solely to narrative (literary) or ludic (audiovisual) forms, where either chaos is rejected and the computer games are subject to linearity or the chaos of computer games is naively affirmed in the perspective of treating it as an entertainment phenomenon. Although both of the above approaches from different perspectives help to understand computer games as culture phenomena, they equally try to formalise experience, while chao-aesthetisation dislodges the player from both linearity and from the purely ludic, introducing him or her into the zone of chao-aesthetisation,

⁹ This stemmed from the fact that computer games enabled their users to experience an immersion into the world of the game, thus making reception independent of the outside world. As culture objects, games required the user's full commitment to the world of the game. This made the aesthetic value of the game more influential than any other technical media available at that time, i.e. radio and television. Of importance here is also the new, interactive nature of the interaction between the user and the digital culture object. As a result, the player received an immediate reply from within the game and no longer perceived him- or herself as solely a recipient of a ready product, but had the impression of actual participation in shaping the game world by selecting the actions of the character the player controlled. All of the above new factors contributed to an increase in the direct aesthetic impact.

where literary and ludic phenomena interrupt the player's existence in a non-sequential manner, thus creating chao-aesthetic hybrids which cannot be contained within simple formalisations. The experience they trigger is first of all existential; the players adopt perception patterns and the aesthetics of the game they prefer as desirable. At the same time, the games, as technological phenomena, perform ludic, narrative, educational, ideological and political functions. The existential configuration of the aesthetic phenomena programmed by computer games is responsible for their significance. However, what is of prime importance in all of the above functions is the aesthetisation of a technologically mediated experience. As was already indicated, unlike the earlier media of culture transmission, computer games are defined by multiplicity, so that the aesthetisation of experience is chao-aesthetisation, where the multiplicity of computer games impacts human senses in a host of different, often contradictory ways. There is no need to reconcile incongruous and internally contradictory experiences. Chao-aesthetisation is not, however, a narrative interpretation since word and text are only one of its elements, but it is in fact an infinite clash of interactive audiovisual states of existence arising from a combination of the affectation of the player and the reality of the game, which do not correspond with each other in the overall narrative interpretation. This arises from the essence of computer games, which programme their users' experience. The culture of turning on and using computer games is connected with the chao-aesthetisation of experience, since computer games function as objects interrupting the presence of a subject for the sake of transferring it to the immersive, technologically-created reality. When at play, the subject disappears and ceases to exist in one reality, only to start operating in the other reality. Chao-aesthetisation justifies constant movement between the mediated and unmediated world, offering the user the aesthetic pleasure of logging in and logging out from the reality of computer games. Thus the user perceives as positive the chaos arising from multiple games, which immerse him or her into their own world.

Chao-aesthetisation may, then, create a virtual field of potential for art. It allows the creation of foundations, unstable and open to chaotic interactions, which will enable the development of a sensitivity needed for creating an interactive art that operates not only in the users' experience but also in the institutional and market space of art distribution. Computer games test the expressive potential of the media, while art remains indebted to them. Thus this ludic medium sets the standards of interactivity which artists refer to. In this sense, computer games that trigger chao-aesthetisation in users may fulfil the role of art. For this reason computer games should be regarded as a kind of art of the future which has not come to exist fully. This is the idea of the chaosmos as put forth by Deleuze and Guattari: an inexhaustible pool of possibilities which precedes all experience. Therefore, it is a mistake to reduce the aesthetics of computer games to historical theoretical definitions. This art precedes experience and accelerates the operation of human perception, thus making the human being react actively to the events taking place in the game world. Chao-aesthetisation is a technical bringing out of objects from the chaosmos and their introduction into the recipients' experience, which offers an entirely different recep-

tion of time and space. The player is in a state of shock not only when reacting to the events within the game world but also when leaving the game; the reality outside of computer games is a shock. Therefore, the player's fundamental experience is that of chaos, which does not operate on the presence of an object for the subject as a paradigm necessary to comprehend the subject's experience in culture, as the player encounters objects of different velocity which dislodge him or her from the reality as is, but later returns him or her to it. This triggers chaos in the experience of the world since the user is exposed to the operation of multiplicity. This means that multiple computer games model the user's experience and perception habits, constantly changing and adapting to the audiovisual data introduced on the technical interface.

Therefore, the pursuit of structuralist paradigms to interpret computer games as art seems misleading, since computer games are reduced to formal systems. I believe that experience should be the criterion for analysing games. I do not reject at the same time the other approaches as ineffective, since they are all related to experience. Still, I stress the primacy of experience, especially its aesthetic programming. The player is both the subject who experiences and the object for whom the experience is programmed. This calls for an extended phenomenological perspective and for its partial reversal. It is not that the phenomenon is given to consciousness as fully available, but the direction and manner of the phenomenon's presence are imposed on the consciousness. Chaos arising from the multiplicity of disproportionate memory data impacts the user rather than some consciousness directed at the computer game as a work of art. A computer game is more of an experience than a material or visual object to be interpreted. This reversal of the phenomenological relation consists in the fact that the user is interpreted by a computer game in that it interprets the world from the position of a direct participant of the events taking place in the game. The difference between the phenomenological proposal forwarded by Husserl and by his followers concerning the programming of experience consists in the difference in the velocity of this phenomenon coming into being. The player is made to react to the emerging phenomena very quickly. There is no time to suspend or analyse them and later to bring them out of memories created by the aesthetic programming of the player's experience. In chao-aesthetisation, the user is interpreted by the game in that it creates an environment in which he or she operates. The ability to modify the world where the player is immersed is also pre-programmed. In this way the phenomena of computer games impose themselves on the players, assault them and, without awaiting interpretation, make the player active in the reality of the game.

In the perspective of chao-aesthetisation, computer games may be seen as art, both via the recognition of the aesthetic pleasure they offer and their location on the market and in institutions. In the FPP game a perfect hit may trigger an aesthetic sensation, just like a sequence of tank movements in a strategic game of real time or a situation on a football pitch in a sports game. The criterion of what aesthetics is is art in itself; it is a part of the players' collective evaluation. All of this takes place within the technological management of the user's senses. The players themselves coin terms for moments of special value,

offering their linguistic and audiovisual interpretations, which proves the efficacy of the programming of experience in computer games. These forms of recording experience motivate successive players not so much to obtain the highest score but to adopt a certain game style which would fulfil certain aesthetic criteria. This is taken care of by the game authors; what counts in those games is not only their completion but also the way it is done. The very being within the space of the game becomes a gradual aesthetic experience which, however, may be disrupted by the interference of factors from the outside world or when the game freezes or cannot be continued by the user. In this sense, chao-aesthetisation is a situation when the user is permanently open to chaos. Chaos may not only be the inner world of the game but the outside world that interrupts entertainment, which dislodges the player from the game world, depriving him or her of an aesthetic experience.

Computer games form the perceptive field of the subject which, during the programming triggering the aesthetic experience, leads it at the same time to its limits, thanks to which it can be regarded as unleashing beauty. We may supplement the question: "Are computer games works of art?" by "When and on what conditions do I experience computer games as works of art?" I phenomenologically analyse the individual phenomena of computer games that demonstrate their aesthetic impact. The above questions cannot be answered unequivocally since computer games reject the classic understanding of a work as an object. Nor are they an aesthetic phenomenon in themselves since they call for a special approach on the part of the player. An aversion to games in this perspective may be explained as a rejection of the aesthetic programming of experience. In this sense, recognising computer games as art depends not so much on the institutional and market framework but on the experience of the subject. Therefore, when discussing Polish computer games made in the 1990s I will focus on their strategies of impacting the subject, i.e. on how they trigger chao-aesthetisation, introducing a reality which has never been immediately present into the player's experience.

This requires a methodology which takes into account the chao-aesthetisation of the researcher him- or herself. This perspective, on the one hand, comes close to phenomenology and, on the other hand, transcends it since the user interprets what is given and what his or her consciousness must adjust to via feedback with the interactive game environment. Still, this is not only the user's consciousness but programmed possibilities of reception which offer the game world a limited set of possible interpretations, namely the ways the subject operates in the reality of computer games. I have therefore chosen to analyse those computer games which had an impact on my person in the 1990s when they were released on the market as new products setting standards for ever new computer games. I played these games again to confront the aesthetic experience triggered by their use with the past experience of chao-aesthetisation. This research perspective allows me to juxtapose different ways of experiencing computer games and testing the aesthetic experience programmed by them. Chao-aesthetisation in this perspective does not rule out the repetition of experience but checks its conditions, the way these games influence the user years later and the extent to which this impact changes in the course of development

of the computer games industry. I believe that such a re-creation of past experience should be discussed as chao-aesthetisation, or the permission of many possibilities of mutually contradictory receptions, rather than a faithful and deeply nostalgic reliving of memories related to games. We are dealing here with the experience of an aesthetic programming of the player's experience and not with a spiritually psychoanalytic method of reaching the player's memories responsible for the future experience of computer games.

The reflections on the influence of computer games stem from my experience from over a decade ago and my more recent experience. The games, apart from those for Atari computers, were launched in an environment that was as similar as possible to their original environment, i.e. on an old computer, with the use of corresponding peripheral devices characteristic of this computer generation.

These observations help map out my perspective of researching games, which is the basis for the generalisations used in this article. This method will allow a comparison of their impact and their juxtaposition in a time perspective. Adopting this methodology is underpinned by the uniqueness of the games of the 1990s since they had a powerful impact on my aesthetic preferences and the aesthetic preferences of many other players in Poland. Although we can identify individual differences in the reception of computer games, the programming of experience means they were received in a similar way by different players because of their enforced immersiveness. The analysis of chao-aesthetisation addresses the experience of the subject; it does not shun subjectivity. Being mediated, i.e. being exposed to the programming of experience, calls for tracing the dislocation of one's point of view. In the method of representing computer games, I have applied the time perspective of my own experience to demonstrate both the possibilities of analysing computer games and the particular strategies of their aesthetic influence. These analyses are to develop a way of researching computer games which combines the subjective, aesthetically programmed impression and objectifying theoretical approaches in order to help understand the experience of playing computer games, which is originally and inherently chaotic. The problem with such an approach to computer games lies in the fact that they may demand the suspension of a natural approach, impose it or create still other effects. Therefore, I will call for developing an approach while addressing the analysed phenomena rather than for adopting a historically established methodology of studying computer games. Only in this way can we reach out to the "thing in itself" or a "computer game in itself" in its chao-aesthetic impact. These and many other introductory comments were put forth after studying computer games. Their number, which equals that of the analyses of the games themselves, is motivated by the fact that such an introduction offers a picture of the general nature of the aesthetic impact of computer games, which shows that they permanently change the perception of the subject. This applies in particular to the computer games from the early 1990s, which in Poland played a number of other roles apart from their aesthetic function. Their existence was first and foremost a generational experience, which had an impact on the later culture of the aesthetic influence of computer games through magazines (*Top Secret*, *Bajtek*, *Gracz*, *Świat Atari*, *Secret Service*) and the

emerging communities of players. The players' reliance on the literary medium of magazines resulted from an absence of a hermeneutic interpretation of chao-aesthetic experience in culture. Therefore, the popularity of those magazines should be interpreted as an attempt at strengthening one's own experience through its legitimacy in the emergent culture of players, rather than reducing this experience to a description. When reading those magazines one was further motivated to become immersed in the world of games. They added ever new elements introducing chaos into this experience in the form of solutions to problems in the world of games, different codes, and possibilities of interaction between players in the real world. The entire convoluted complex diversified, enhanced and impoverished the aesthetic experience of the players. Besides the standard descriptions of games, the magazines also offered self-help columns, letters from the readers, solutions to many other games, and descriptions of events from the games industry. They moreover anchored the aesthetic experience as they facilitated its comparison with one's own experience programmed by computer games and made it chaotic by furnishing many records of this experience, including patterns of changing one's own behaviour in the immersive world of computer games. At present, the same role is played by YouTube, where players upload films with their personal comments, thus showing entertainment in real time. This also contributes to the chao-aesthetic experience since the player unconsciously adopts certain patterns or acts against them. The game of another user, in audiovisual form, also aesthetically programmes the experience of the player. The existence of magazines in the 1990s is interesting in that it did not interfere with the experience of computer games to the same extent as current pre-judgments of games broadcast on YouTube do. The magazines offered greater leeway for interpretation, while audiovisual records of chao-aesthetisation provide, in turn, ready perception patterns.

The chao-aesthetisation of the players' experience is perfectly demonstrated by two well-known games from the 1990s, namely *Miecze Valdgira* (*Valdgir's Swords*) and *Polanie* (*The Polans*).

Miecze Valdgira is a platform adventure game created by *Atari Star Force* for an Atari computer in 1991. Its authors tried to faithfully render the climate of a murky, fantasy reality in which magic triumphs over mind. This is made possible due to the modest furnishings of successive locations traversed by the protagonist and by inclusion in this game of many characters which the authors, having at their disposal particular graphic means, tried to show as malevolent. The presence of a knight, dragon and diviner in the game was not justified in any narrative way but was supposed to dislodge the player from activities consisting in struggling with floating objects, which was the arcade element of this production. The player had to fight against flying barrels and crystals whose existence was hardly justifiable, and which only enhanced the experience of mystery. The lacunae could be filled by the player's imagination. Immersion in the plot and identification with the protagonist was a matter of work on behalf of the player's imagination since being-in-game caused a particular aesthetic state which did not recede long after the end of playing. Very few graphic means were capable of creating an aura of mystery and awe which, especially

in young players, triggered a sense of risk and uncanniness. In order for the protagonist Aldir to be able to further explore the game world, he had to perform a series of actions, including handing over Tarot cards to the diviner. Through an absence of narrative justification for the actions and the algorithmic necessity related to the requirement of linear movement through successive locations, the game exerted a direct impact on the imagination of the player, plunging him or her into a world with no rational justification yet with a conspicuous structure characteristic of platform games. This was accompanied by very austere sound effects, which did not help to precisely locate the world the player was thrown into either. This weakly developed audiovisual element was still capable of a far-reaching aesthetic programming of experience, which makes *Miecze Valdgebra* a complex system of aesthetic influence rather than solely an aesthetic phenomenon. It contains a conceptual aspect expressed in the medium of computer software, but at the same time transcending this software and triggering a feeling of uncanniness. The protagonist himself, Aldir, was originally portrayed as a hybrid of Hermes and a knight who did not belong to any specific historical era. The game itself contained elements of fantasy and triggered a sensation that something remains hidden, although everything was explicit and evident on the board the player was on. Single words which appeared over the objects collected by Aldir, in combination with the essence of the game, prevented one from treating the non-anthropocentric enemy as pixels but as an apparition which tried to put our protagonist at risk, a manifestation of the dark forces of the game. Despite the recurrent existence of enemies, the existence of the characters to whom Aldir was supposed to offer an object set in motion a process of chao-aesthetisation of the player's experience. This was because the player was able to create speculative and narrative justifications for his or her own being-in-game. In this sense, the climate of awe permeating the game did not depend on the monsters but on the configuration of colours and strange-looking characters which made the game mysterious even when Aldir had to jump between successive planes. All of the phenomena can be analysed from the perspective of uncanniness. The player had to imagine the ending since his or her adventure finished with one sentence, which was a frequent conclusion in computer games of the 1990s, in which emphasis was put on the entertainment itself and the conclusion played a marginal role. Thus the player could either be disappointed by the ending, imagine it or create a continuation of his or her own game. This in no way undermined the value of the entertainment. On the contrary, it emphasised its significance. This game was for many users not only an element of entertainment but also an experience of the generation, one that defined the structure of their imagination arising from the aesthetic programming of experience. Chao-aesthetisation made users fill up the game world with their own imaginary content, and thus their reception differed and called for an additional discursive concord to agree on the nature of reception of *Miecze Valdgebra*. Today, too, this game produces similar effects, even if now, from the perspective of the time that has elapsed, they can be scrutinised far more in-depth in order to identify interconnections between the characters and to discover the conceptual core of *Miecze Valdgebra*, transcending beyond the game's algorithm.

Polanie is a strategy game in real time which was manufactured by MDF in 1996. It contains the *eidōs* of history, transporting the player to 960 AD. The interplay of colours gave the player the impression of returning to the past. The entire setting of the game is slightly austere as for the graphics, with few ornaments, which was to emphasise the aesthetics peculiar to the Polans tribe. Moreover, the extremely simplified movement of the characters offered an imaginary uniqueness peculiar to this period, offering a sensation of coarseness and clumsiness. The same can be said about the phrases of the warriors: "Let's go!," "What?," "As you wish!," which indicated the austere audiovisual setting, augmenting the aesthetic asceticism of the game. *Polanie* is an example of a computer game created in relation to history but urging one's imagination to visualise the reality prior to the creation of the Polish state in 966. Thus, *Polanie* provides the user with ready interactive images of what the past looked like a millennium ago. The phenomenological effect is no doubt important here. It consists in the absence of additional games phenomena with which the status quo could be confronted, and which could offer alternative interpretations of Poland's history. At present, if we wish to get to know games on ancient history, we have a number of available titles or potential phenomena out of which we can only try and single out an *eidōs*. The very awareness of the diversity of the phenomena makes it difficult for the player to recognise the game as natural in the phenomenological sense, i.e. as representational self-assurance of the world of life shared by other users. Therefore, such a transfer of the player to the time when the Polish state was being born is chao-aesthetisation, or the introduction of a dissonance between the awareness of history of that time as taught in schools and its audiovisual and interactive interpretation in the form of computer games. The game *Polanie* not only offered an image of the past but also the possibility of interactive participation in it, a transfer into the reality from a thousand years before. The simplified interface did not put constraints on the player's imagination. On the contrary, it conveyed the climate of that era by partially patterning itself on historical reality and by partially creating it. The bloodsucking creature living in the forests (a Slav beast which in the game killed milk cows, the basic and only resource in the game), despite its rather conventional appearance, instilled a sense of awe, not only with respect to the loss of resources but first of all because it was a creature of a metaphysical threat. This is important from the perspective of the aesthetic strategies of reception of computer games since it was triggered in the player's mind via his or her imagination and in a concrete device, through ready, aesthetic phenomena present in the environment of the game, considered purely instrumentally from the perspective of tools as something that can come in handy for the implementation of a given mission. For the sake of contrast, we may invoke images of monsters in contemporary strategic games or FPS, which are not scary in terms of context (the abduction of a cow), but because of their monstrosity (e.g. the monsters are larger than the player in the game *Painkiller*). In this sense the player did not only receive a certain, ready image of the past, which was interactive, but was also able to imagine the fundamental emotions of the virtual characters he or she set in motion. The diversification of the past, i.e. the addition of the fantasy element such as an evil bloodsucking

creature, and simplifying the game by reducing the resources of cow milk, transported the player to a fantastic history which at the same time shaped his or her imagination about Poland's past. If, however, we wanted to unify the few above-mentioned themes and to sum them up, we would have to observe that the aesthetic reception strategy, despite the low degree of complexity and possibility of interaction between the player and the world represented in the game, helped single out certain aspects of the game and fill them up with one's imagination, thus initiating chao-aesthetisation. This triggers an intractable clash between historical knowledge and one's personal experience of the immersive world of the *Polanie*. On the one hand, the player controlled the activities of the characters, and, on the other hand, was doomed to a certain conflict with other tribes. This did not strip the user of free will, as he or she knew the historical reality, so that chao-aesthetisation stemmed precisely from what was unavoidable at that time, i.e. the struggle for territory. In this way the aesthetic experience was rationalised by historical necessity, which found its place also in special tables onto which were projected holy statues and explanations of the sense of successive missions. Their function was both instrumental and aesthetic. Rooting computer games in the context of the territory of contemporary Poland perpetuated the aesthetic experience of the entire game and caused chao-aesthetisation, which questioned, due to the very participation of the player in the interactive game, his or her knowledge of history and supplemented this knowledge with various facts. First of all, however, it offered the chance of a direct, ongoing experience.

The 1990s is an important decade in that at that time the computer games themselves were an experience of the generation. The very existence of computer games encouraged users to take the effort and create their own productions or modifications of existing ones as they were a medium open to modification and supplementation. Aesthetic pleasure was derived from the game itself and from the possibility of searching its files to identify certain resources, e.g. textures, sounds and music files, which could be played independently. Thus the aesthetic experience was extraterritorial and became part of the world of the life of players who used the game's multimedia files. The players used this experience of computer games onto the chao-aesthetisation of the operational system by supplanting standard audio files and wallpapers with music from computer games. The very need of being immersed in the aesthetic realm of computer games such as wallpapers, sounds operational systems and their use in creating one's own versions of characters shows a powerful aesthetic impact. This is of special significance in the perspective of games from the 1990s, since their graphics were often of very low definition, i.e. 320 × 240 pixels in PC computers and 320 × 192 pixels in Atari XL series. Very evident pixels and simple graphics in no way hindered the aesthetic effects of the computer games; on the contrary, they often augmented those effects. This explains the interest of many users in 8-bit computers who still continue to develop games and graphics for fun, demonstrating them during competitions or storing in their recourses. In comparison with present-day graphics software, creating graphics and animation on 8-bit computers is far more time-consuming. However, it furnishes a unique aesthetic experience on the part of both

the authors and users. It is computer games and often fantasy and science fiction novels that inspired graphics authors in the first place. Players were then interested not only in passive consumption of computer games, but also actively programmed their own experience by creating the graphics and animations and making them available to others. These practices may demonstrate a kind of asceticism, since the ideal here is to create something impossible for a given machine. An example here is the creation of graphics which will arouse doubts as to their creation on an 8-bit computer. At present we still see the creation of games and many different ways of processing early computer aesthetics, which continue to update the paradigm of chao-aesthetisation. Although the computational capacities of present-day computers do not force the graphic designers and programmers of computer games to optimise code to the maximum, there still exists a unique stage which makes this very aesthetic experience the basis of its own existence. Objects made in this way find their recipients but also attract a new clientele learning about the world of games of the 1990s. We may therefore assume that they exhibit an autonomous aesthetics which, despite the passage of time, remains as attractive as ever. Moreover, it often becomes part and parcel of popular culture as it is used in the creation of advertisements, music or apparel motifs. "Old games" are slightly upgraded so that they may be played on currently popular operational systems, and ever new versions of emulators of platforms from the 1990s are made to retrieve the aesthetic experience of that time. This stems from the fact that the player had a greater degree of control over the environment, and his or her actions in the game could be regarded as more significant. Aesthetics was inseparable from democratisation, since the player was more of an interpreter of the game environment, and to a lesser extent performed a series of activities imposed by the game environment, indispensable to their experience. Paradoxically, the lower number of possibilities, which were however more significant, gave the player freedom of choice in the immersive environment of the game. At present this perspective is greatly limited since the player either follows the possibilities strictly defined by the authors of the computer games or enjoys unlimited freedom in creating his or her own protagonist profile or game, and thus each decision is reversible and repeatable. In the computer games of the early 1990s the user was exposed to an experience that was programmed for him or her and found freedom via a series of interactive activities within this experience.

Just as people discover all kinds of existential motifs in painting and music, so too computer games revealed something about the world. They provided an updated commentary on the social and political transformation, although more often than not they did not directly address this transformation. Sometimes it was enough for one sentence in an adventure game, a fragment of some object, iconic from the point of view of culture or history, to direct the player's imagination towards an ongoing analysis of reality. Thus these games were never solely ludic media for generating pleasure. This is because of the very presence of the algorithm, which is both aesthetic and political, as it determines the agency of the game's user. Aesthetic pleasure is triggered, moreover, by the errors present in computer games as well as the deliberately programmed possibilities which the player

must discover. Because of the above, the algorithm cannot be discussed exclusively in technological terms. Rather than that, we should examine its contribution to the chao-aesthetisation of human experience via its culture potential. The player may also deceive the algorithm by entering different codes which will allow them to circumvent different game fragments or create their own overlay, thus modifying the game. This was especially crucial in the games from the 1990s, as it offered players the opportunity to control multimedia products and unleashed their creativity so that they responded by using an aesthetic imagination which emerged in the course of aesthetic programming of their experience. At present, this interference does not concern directness since games are increasingly complex, and access to their code is hampered by the producers. Often there are ready-made level editors and possible modifications which entirely change the way the game exists in the user's life since it requires another type of activity. In the case of games from the early 1990s, especially adventure games such as *Sołtys*, *Teenagent*, *Kajko i Kozosz*, *7 dni i 7 nocy* and *Skaut Kwatermaster*, despite their relatively simple plots there was a commentary on the immediate reality. They may be regarded as closed wholes, where the aesthetics of Polish society dominated over the interfaces patterned on Western computer games. Often the interface was patterned on Western productions, but the plot itself was adjusted to Polish reality. This allowed the players to aesthetically experience present-day reality. The above-mentioned computer games commented on the fledgling Polish democracy as they often ridiculed the negative characteristics of Poles and provided a diagnosis of the present time. There were also, however, computer games in which the political function dominated over the aesthetic one. Such games included *Operacja Glemp*, which was very anti-clerical and the task was to get out of the curia presented as an oppressive totalitarian institution. Ecclesial circles did not treat it as a purely aesthetic product but noticed the threat it posed on their values.

Later, a clear ideological and political polarisation of computer games took place. They ceased to be only expressive of their authors' individual approach to the social reality but became conscious ideological vehicles. This helps to see how aesthetics served politics. Namely, the player interested in the plot of *Operacja Glemp* and at the same time unaware of its anti-clerical tenor unconsciously adapted the critique of the Catholic Church as an institution. This game, due to its austere graphic content, cannot be truly seen as art or a particularly aesthetic product. Nevertheless, the very medium of computer games plays a democratic role, thus becoming a tool of social critique. The user was able to look at institutions of social life from the perspective of their possible critique via the parody present in the plot of computer games.

This kind of experience is stored in the users' memory and makes up their relatively stable dispositions of perception, thus influencing their aesthetic preferences. They trigger a taste capable of transcending all of the political, social and market conditions of computer games. Chao-aesthetisation cannot be contained solely within each of the above dimensions. The very aesthetic quality of Polish computer games from the 1990s creates stable dispositions of perception. Analysing present-day games does not in the main offer

such a possibility since they are ready-made products and their aesthetic functions are open to exhaustion if only because successive parts of the game are envisaged at the moment of their creation. Thus, no autonomy of the product is postulated besides its continuations, which introduce ever new patterns of innovation. Following Walter Benjamin, we may say that they are stripped of an aura, or a unique aesthetic capacity arising from direct interaction with them. Therefore, authors often refer to the aesthetic patterns of the games created in the 1990s, which embody their aesthetics in a state-of-the-art technological environment. This applies in particular to the so-called *indie games*, or independent games whose production is often motivated by aesthetic rather than commercial aspects. Furthermore, this arises from the uniqueness of Polish games of the 1990s, created by small teams of people who had limited resources. Active currently is the so-called stage which holds meetings, congresses and competitions to create computer games for older computers, and in particular 8-bit computers. In this way, the experience of a generation of computer games is transmitted onto other users, who find in it attractive aesthetic qualities and prefer relatively less advanced computer games over their present-day equivalents. This experience, however, is never repeated but always diversified. The aesthetic experience triggered by the programming of experience results from chao-aesthetisation, which in this case assumes the form of new modalities and a simultaneous retention of the aura of the original games made in Poland in the 1990s.

A comparison of Polish computer games from the 1990s and those that came later must moreover indicate that their market character, distribution and the kind of culture created by and around them were all entirely different. The slow nature of computer games from the 1990s required a nearly meditative approach since they had to load for a certain period of time. This in itself was a vital element of chao-aesthetisation used to date in the Internet culture.¹⁰ This applied in particular to 8-bit computers, in which the loading of a game from a cassette called for the user's meditative mood; any error meant a re-start of the entire procedure. At present, a computer game is installed without any major problems, so there is no state of waiting for it; the only question is the speed of the computer. This, too, exerted the strategic aesthetic effect of awaiting a computer game to appear on the screen, which could be interpreted in terms of success preceding the playing of the game. This called for a certain aesthetics of existence which implied that the game was not simply started; it was part of a series of actions related to its distribution, adjustment, and playing. It was not the game itself which imposed a certain immersion, but the activities of preparing for starting the game. The latter created a unique atmosphere, an aura which, however, was not permanent but, depending on the circumstances, differently

¹⁰ This especially applies to the long loading process of games to be played on 8-bit computers, often accompanied by the words "loading." It contributed to a unique aesthetic experience of forced focus since due to technological imperfections the loading could be interrupted at any stage. The game was highly unstable and both a successful start of the game and an error which halted it were chao-aesthetic experiences. A meditative turn is not at variance with chao-aesthetisation but is its component.

chao-aestheticised the user's experience. Similarly, with respect to PC computers, one sometimes had to create special settings of DOS system files to be able to release additional memory space that was indispensable to starting the game. Through this action, meant to facilitate use of the game, computer games were used aesthetically and became part of the game experience, thus introducing a kind of mediated directness. The difference between Polish games from the 1990s and the present ones consists in the fact that currently players often give up directness for the sake of extra-territoriality of their experience. That the user had to take care of the hardware and not kick the cassette-recorder accidentally involved him or her not only mentally but also physically. A computer game was a space, not only an experience following its immediate launch. The user was more aware of the role of the equipment, the environment, and his or her own obligations as to the adequate configuration of space allowing the game to be started. This was linked to the aesthetics of error, which was inherent in computer games of that time. They were often incompletely developed, froze, and some could not be finished successfully without installing updates or acquiring new versions. Therefore, the player was aware of possible failures, which has been transferred today into the inner structure of the play. A player in the 1990s was an aesthetician, a hermeneutist of errors which interrupted playing in the least expected moments. Therefore, the possibility of error was an inherent part of the game; an error could be triggered by both the hardware and the software. This made up a complex context of the aesthetic programming of the player's experience. It was to a large extent marked by uncertainty, which is an element of chao-aesthetisation.

The aesthetic effect of computer games consists in the programming of experience, which oscillates between the immersive reality of the game and its references to the outside world. This chao-aesthetic experience is stripped of the classically understood disinterestedness that is present in the user's approach; the authors programme an effect which calls for a certain predetermined perspective on the part of the player. Disinterestedness is then a programmed audiovisual effect. The games created in the 1990s demonstrate this disinterestedness since the computer games market did not call for competitiveness, which then left more leeway for the authors. They could thus programme aesthetically, but due to the rampant piracy and absence of legal regulations concerning software, this programming was not truly meant to earn a profit but rather to transmit a certain world vision. The lack and impossibility of effective enforcement of copyrights and the general disregard for it by players made the authors of computer games aware that the game was doomed to be copied. Therefore, they allowed their games to be treated as means of creative self-expression, more than a multimedia product meant solely for consumption. Thus the computer games of that time were better able to convey cultural senses. They contained not so much a sellable idea but a unique experience of their authors, which via chao-aesthetisation became the players' experience, i.e. it became diversified.¹¹

¹¹ At present, when computer games are a matter of a huge industry, they are products which can be upgraded. This upgrading is carried out at the expense of the meaning they convey, and with the introduction of

The reflections made here are not supposed to demonstrate the superiority of the games from the 1990s over present-day ones but rather to show the unique kind of experience these games offered. This experience did not arise from the efforts of marketing experts, programmers and graphic designers but from those people who vented their ideas, imaginativeness and drives via a computer game. They were therefore more involved in the entire context of creating the games; they simply wished to make a certain game. This feature reveals another level of chaos-aesthetisation between the intentions of the games' authors and their recipients, which also played a major role in the aesthetic programming of experience. The chaos-aesthetisation of present-day games is connected more with the relation between the player and the artificial intentionality of the immersive environment of computer games rather than with the aforementioned tension between both intentionalities.

Computer games impact their users in a host of different ways because of who the users are; this is what the programming of experience is all about. Games can create the player, but only if he or she allows them to do so to some extent. Therefore, we are dealing with individual differences in the impact of computer games, and these differences have a significant bearing on the character of the chaos-aesthetisation they bring about. We can play superficially, browse different games and replay a given game anew, reiterating and thus strengthening the chaos-aesthetic experience. The general effect of the aesthetic programming of experience caused by computer games is contained, moreover, in their default settings and depends on how often, who is playing and in what circumstances they are started, on the degree of access to them, and on the hardware platform used to update them. All of the above are parts of the chaos-aesthetisation triggered by computer games. Furthermore, they have a certain common denominator arising from the relatively low graphic advancement of the games. Namely, we can at once feel a part of a given game and need not learn for this purpose games made before it or those produced afterwards. The aesthetic simplicity of these games causes their direct immersive nature and launches the work of the imagination, diversified by errors, indeterminacies, and the absence of extensions which inspire other authors who creatively rework the above deficiencies. For this reason the aesthetic effect of the games is also present in the present, when the user is struck by the aesthetic effect simplicity of certain formal solutions. As all other culture artefacts, both tangible and symbolic, computer games set up their own networks of reference; the only difference is that no uniform zone of the values they create is established. They foreshadow a culture based on permanent structuring of the chaos arising from the

programming experience it is based mainly on the creation of an appropriate configuration of the user's senses. New games continue to be created, and although they assure a level of immersion incomparable to that of the early games, the individual presence of their authors is less visible. The computer games of the 1990s were to a greater extent closed wholes, with which the subject tied certain recollections permanently stored in the memory, since his or her aesthetic experience was programmed and prepared by a small group of people rather than extensive developmental studies.

multiplicity of computer games and from their chao-aesthetisation. Therefore, games should be seen as any other culture object in that the experience of computer games relates to other computer games but operates at the source without a basis; each game may be transformed, each genre technologically refurbished and adjusted to present-day computers and consoles. The user does not become immersed in a particular game at once and he or she may find the game too simplistic, boring, or having a complicated interface. Experience appears in often unexpected moments and cannot be precisely traced and singled out. It is therefore chao-aesthetisation rather than an equivalent of one of the philosophical concepts of an aesthetic experience. Often, when playing a very simple game, one can experience different types of aesthetic effects, but it is also possible to see this experience in combination with playing in terms of art. Namely, a configuration of pixels reminds the user of something or, conversely, directs his or her imagination towards something that transcends the game; it refers not only to the life of his or her imagination but is underlyingly a border experience. This is a spectrum of aesthetic effects which is often not envisaged by computer games authors. Earlier they were experimental, and the aesthetic experience arising from contact with them transcended the framework of the algorithm. This is so because the aesthetic phenomena of computer games impact sensitivity, which develops permanent perception dispositions, perpetuated both in the user's memory and in body movements – an effect of the chao-aesthetisation of his or her senses. Chao-aesthetisation gives an account of this process by taking into consideration multiple layers of experience.

The analyses here relate to computer games from the early 1990s that were created in Poland. This is especially significant in that the transformation of the system and the historical moment which Poland went through made computer games one of the fields of emancipation and provided possibilities for developing the represented world beyond political censorship. This did not mean an escalation in banned content but, on the contrary, led to communicating via games of some kind of world experience through the aesthetic programming of the player's senses. Computer games were a medium of their authors' intentions. This designing of intentionality concerned, first of all, a precise and deliberate construction of the represented world, or a virtual world of life available to the player in a particular interactive product. This is accompanied by a special aspect of novelty that the player is faced with. On the one hand, the player becomes immersed in the technological environment of the game and, on the other hand, he or she takes all of his or her knowledge and sensitivity there. There are incessant tensions between these levels and as new games appear; and a degree of chaos of all the levels which cannot be contained by the representation of the current world rises.

Polish computer games from the 1990s may be interpreted as art since they transcended their simplest development stage due to an increase in the computational capacity of computers with the additional strategic capacity constraints imposed by the industry. Thus the idea of a game was as important as the computations within it, manifested in its algorithms and the audiovisual setting. It was this conceptual element which played the

most important role in computer games from the 1990s. Graphics, music and the entire interface implemented the idea of the game and as such were evaluated from the point of view of that underlying idea. This can be observed in the computer games re-introduced onto new hardware platforms, such as the *A.D. 2044* computer game. The concept which underpinned the game was not limited to the plot solely but concerned a certain way of being-in-game, or of shaping the user's aesthetic experience which went beyond the graphic and narrative elements of the game, thus leading the user towards chao-aesthetisation. The mediated and unmediated world swapped places dynamically, which triggered an impression of instability of both, and which the player received as the aesthetic programming of experience. Because of that we can say that the aesthetic phenomena of the computer games of that time were characterised by complex interaction with the user not at the level of phenomenon but of essence (*eidos*). They had an essence which, despite platform shifts and improvements, retained its core, i.e. the distinct climate of the game, or the quality of computer games which could not be reduced to its autonomous part. This was possible since computer games in the 1990s were slow enough to capture their *eidos*. At present, players are confronted with such a plethora of stimuli that they have problems discriminating their importance. All of them have the same dimension of enforced programming of experience. The deficiencies of an incoherent plot and code errors were supplemented in computer games from the 1990s precisely by this idea. The conceptual core did not allow players to give up in the face of all kinds of obstacles that the game itself doomed them to, but instead tried to overcome those obstacles. This too is a kind of aesthetic experience consisting in a heroic struggle with the game code by approximating the intention of the authors of the software. This was a time when the Internet was not commonly available and so the player often demonstrated a high degree of determination: they read computer magazines, learnt on their own and talked with other people only to clear away the hurdles of the game they had come upon. Players returned to games for which they did not have an appropriate patch to eliminate errors blocking their play. This is why so many players continue to return to games from the early 1990s since what is inherent in them is not only the effort of being-in-game but also of performing technical operations of maintaining and, if need be, repairing the game, which was part of the chao-aesthetic experience; it could be renewed by returning to the moment where the game was interrupted thanks to the storage of files with the game description. In this case, games brought people closer to life since their deficiencies resulted in socialisation, where players verbalised their aesthetic experience and indicated the need to eliminate the challenges they faced. Back then, despite their predictability, games had a conceptual element, a certain mystery, although once finishing playing the player could be disappointed. When seeking the patches, corrections and descriptions, the player often came across the products of the stage, or people interested in representing artistic references to the phenomenon of computer games, or the creativity meant to shape aesthetic experience. Music, graphics and animations created in cracks and keygens were also a way of an aesthetic

programming of experience patterned on games, but also of a creative reworking. On the other hand, though, games were not fast enough and thus one could talk about and reflect on them in their course rather than upon their conclusion¹².

Because of their uncomplicated graphics and slow speed, computer games from the 1990s could be thought about in real time. This caused the players' multiple interpretations of experience; players already then relished in repeating some activities for the sake of aesthetic satisfaction, also for the element of chao-aesthetisation since the player was often, at the expense of doing the tasks entrusted to him or her, more interested in triggering in him- or herself an aesthetic experience via experimental exploration of the interactive game world. In those games characters could die, and this death was an aesthetic one. In *7 dni i 7 nocy*, the male protagonist controlled by the player killed himself after a failed task, and so it was necessary to reload the game. Death was not rare, which made it assume a special dimension. It was simultaneously experienced as a failure and actual death of a fictitious character in a computer game. At present the idea of killing the protagonist is on the wane. He or she is most often restored to life immediately in the final location, and death is in no way aesthetically highlighted. The screen does not go black, there is no consequence of death in the form of special animation or an effect within the game world itself. Despite the austere graphics, death in Polish computer games from the 1990s meant it was necessary to load the last state of the game or to restart the entire game. This necessitated harnessing the chaos of the game via reiterating the record of a given game so that in the event of death of a character the game could be reloaded. That is precisely why death was more seriously aesthetic, since the user was aware that the character controlled by him or her could become defunct at any time, thus the player concentrated on playing better. Death, then, was slow, just like the games themselves, which had a limited speed of the aesthetic programming of experience of their users and they were able to perform thinking operations unconsciously, so that they were a part of their immersive being-in-game and of transferring perception patterns beyond computer games, and projecting them onto reality by automatically transmitting what was aesthetically programmed to them during the play. The imaginary modifications of the game world became the player's permanent dispositions. The player imagined different endings, mentally designed ideal games and wondered about possible evolutions of the genre. The sight of death in a computer game did not have to accustom the user to death. Death was impartial from the existential point of view, while from the instrumental perspective it was highly undesirable since it obliterated the time spent on the game. At present, because of their speed, computer games precede imagination and the aesthetic anticipation of one's

¹² This is taken care of currently by different programs, more and more often installed in the game itself; they allow the users to record a game and then analyse it. This is motivated not only by strategic reasons but first of all by the fact that games with high-speed interaction in FPP (the *first person perspective*), or RTS (*real time strategy*) games, or other games involve players to such an extent that these players are able to reflect on their own aesthetic experience only after the game concludes.

own death. For this reason the discourse on game studies addresses most often classical computer games, i.e. those regarded as major ones in the course of their evolution. This also explains why people return to games whose interfaces were often more cumbersome than the present-day ones. What is at stake here is the synchronicity of the conceptual core of a given game, a sum total of the intentions of their authors and the relatively low speed allowing the players' mental supplementation and modification of the games. At the same time, the formatting of perception allowed the modification of the players' aesthetic experience.

The impact of computer games on the user is characterised by a high complexity, which prevents the disassembly of computer games into the original set of phenomena. Although today we have games that are far more advanced than the adventure game *Kajko i Kokosz*, the simplicity and climate of games from the past have no direct counterparts today. This is mainly due to the careful location of different virtual objects which the player may snatch, acquire or use. It is in their configuration combined with the interactive capacities of being-in-game that we can find the possibility of delineating an autonomous conceptual zone of a given game, which impacts the entire narrative zone. This refers to the experience of traversing successive locations, which in a specific manner programme the user's experience. They may both calm the user down or arouse a sense of permanent uncertainty and risk. They allow references between what happens in the game to the world outside it through spontaneous reactions or more unconscious actions. Since phenomena in the case of earlier art forms were not complex in an intermediate way as it occurs in computer games and did not require interaction in a highly immersive environment, the manner of reflecting on their aesthetic impact must change. The most important question in computer games is not the appearance of phenomena and their aesthetic demonstration to the subject, but the study of the player's own programmed experience. As a consequence, we have no guarantee of our own subjective autonomy but are forced to discover or programme it. The players' intentions are contained in the programming of their own interactions, i.e. their own aesthetic experience. Chao-aesthetisation, in this sense, is moreover the possibility of the democratic participation of players in programming this aesthetic experience. The player programmes what has been programmed for him or her. Since a computer game was programmed to trigger the aesthetic sensation of bliss, the player may enhance or hinder it via his or her operations, but this depends on the particular capabilities of the game environment, the player's predisposition, knowledge, and mental and physical status. Husserl did not take into account a situation where phenomena "assault" the recipient. This possibility was addressed by his student, Martin Heidegger, who proposed his own version of existential phenomenology. The world of phenomena had lost its objectivity and was becoming a workshop, a toolbox to be made use of. This is precisely what being-in-game corresponds to. This applies in particular to the games from the early 1990s which restore the tool perspective. The player used particular objects to achieve an expected and intended effect. The objects-tools were defined in the game world and the player encountered them in specific moments. However, Heidegger's perspective did not take into account the suspension of fundamental existen-

tial modes (or the basic modes of being of the player) given in a computer game. The user need not understand computer games, is not doomed to die (the game may be completed without dying at all). Thus the game world is a "truncated" version of the reality beyond it. At the same time it is also an extension and deepening of a technologically unmediated world. In the case of simpler games, the tool and workshop aspect was far more present than today since the player was more aware of performing interactive operations. Therefore, the use of a glove in *Kajko i Kokosz* was more conscious-oriented than the present-day performance of more than ten operations on objects in contemporary games, where time is the principal factor. Instead of being-to-death, computer games offer many ways of a symbolic representation of death. It becomes an aesthetic phenomenon deconstructing Heidegger's analysis of being. But it can also be completely excluded from players, as in some games one simply cannot die. Therefore the entire tool perspective is subject to the realism of a given computer game and serves exclusively the purpose of an aesthetic programming of experience. It is restored in survival horror games, but with a twist since what is at stake here is the avoidance of threat rather than taking care of oneself (often requiring the sacrifice of other players or bots present in the game). Games from the 1990s were special in that they offered a chance of simultaneous being in and outside the game; players exerted control over the protagonists but did not identify with them at all, even though they had the feeling of being within the space of the game. Thanks to this the game could be more ironic and present to the player all kinds of allusions which he or she discovered during slow exploration. The player was more sensitive to details, which were also far more pronounced. The present-day aesthetics of computer games assaults the player with a host of details, from which the player is unable to single out significant elements. He or she, therefore, perceives all of them in purely aesthetic terms, not relating them to the reality outside the game. The computer game *Kajko i Kokosz*, by applying ludic humour, had at the same time large amounts of irony, which was part of the tool-related interactivity of being-in-game. Collecting laundry from a clothesline or performing other mundane activities was aesthetically strongly ironic; it was an eye-winker at the player, who discovered in these activities some kind of peace and quiet and, moreover, gained a distance to him- or herself. Irony was not contained in words or gestures but stemmed from the configuration of the aesthetic phenomena of computer games and was present in the ineffable intentions of its authors, which made up the process of the player's chao-aesthetisation. In this way the intentions were not subject to the aesthetics of the game, which can be regarded as a kind of democratisation of intentionality, since it was the player who decided on the choice of the game's mode: whether he or she wished to suspend the surrounding reality or whether he or she wished to retain it, distancing him or herself from the virtual world of life that was present in the game. The reception strategy of diverse forms of interaction, plot and other elements was also on the part of the player and was not imposed by the game. The player was able to miss the programmed irony and to treat the abduction of underwear as a common activity, possibly irritating because of its simplicity. These types of computer games, updating the tool perspective, also updated

a certain currently forgotten paradigm of the separation of the human being from his or her tools. Present-day games are increasingly difficult to read in terms of tools and far more easier as sequences of automated actions. Therefore, the aesthetic strategy of the impact of Polish computer games from the 1990s on the player consists in restoring the tool paradigm, which meant a division between subject and object, and which was at the same time obliterated in the chao-aesthetisation of experience since the subject and object depended on the configuration of the game world and were not an objective prerequisite for being the player. If we confront this question with present-day computer games, we should say that they require permanent involvement. Here, when the player leaves the screen for a moment, the many hours of playing may be lost and so the game is a certain totality rather than a toolbox. It has a virtual existence in that it appears and disappears abruptly and is not a manipulated phenomenon that can be returned to. This applies in particular to immersive sports games. Here the player was able to stop to admire the landscape and was not assaulted by aesthetic phenomena which supplanted his or her reception. It is not an issue of nostalgia but of technological and industrial development which enhances the aesthetic programming of experience. It is for this reason that analysing games made in the 1990s is so important; they are models of chao-aesthetisation for today's games. I refer here to serious games, art games and indie games, which often explore the aesthetic potential of computer games, patterning them oftentimes on computer games that were created in the 1990s. Instead of using audiovisual means to offer the best possible entertainment, they furnish an ephemeral notion of climate, or a certain configuration of aesthetic phenomena. This, rather than nostalgia, is the main reason for a return to the early computer games of the 1990s in Polish culture, since their aesthetic phenomena were a bottomless pit of information about the world existing outside the space of the game. In this sense, they constitute a model for other computer games, possibly also conceptual in that they show how the sensual and conceptual elements may combine in the perspective of chao-aesthetisation. This is especially evident when younger players who use emulators begin to learn the games from the 1990s, noticing in them what today's games often lack, and this is precisely their power of impact. I mean here particular impact strategies that are not reducible to the technology of computer games. Via interactivity, the intentionality of the game may be partially recreated. This recreation is never complete, however, because of the different context of interactive immersion, thus it chao-aestheticises the user's experience.

Computer games created in Poland in the 1990s are without a doubt a unique phenomenon. This uniqueness was demonstrated against the backdrop of present-day computer games to help bring out the different aspects of chao-aesthetisation peculiar to the aesthetic programming of the players' experience. We are better able to understand how these games became the experience of the generation and at the same time offered a unique medium for the intentions of their authors by being an inexhaustible source of inspiration for ever new computer games. Moreover, it was crucial to stress how, at a relatively low level of the games' audiovisual advancement, they engaged the player's imagination and senses, both of which supplemented the immersive world of the game.



XX Recollected, installation, Marek Straszak, 2013





Sonic Explorer, Szymon Kaliski/Marek Straszak, Art+Bits Festival, Katowice, 2014



MODIFIED SOUNDS

Lidia Zielińska

Electroacoustic music – repeatability and non-repeatability

Rafał Zapala

The influence of technological revolutions on the strategy of sound organisation

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. The text notes that such records serve as a foundation for decision-making and are critical for identifying areas of inefficiency or potential misuse of resources.

2. The second section addresses the challenges associated with data collection and analysis. It highlights that while digital tools have significantly improved the speed and accuracy of data gathering, they also introduce new risks, such as data breaches and system downtime. The document suggests that organizations should invest in robust cybersecurity measures and regular data backups to mitigate these risks. Additionally, it stresses the need for clear protocols regarding data access and sharing to ensure that information is used responsibly and in compliance with relevant regulations.

3. The third part of the document focuses on the role of technology in enhancing operational efficiency. It argues that the integration of artificial intelligence and machine learning can help organizations analyze large volumes of data to identify trends and predict future outcomes. However, it also cautions that the implementation of these technologies must be done thoughtfully, with a focus on training staff to effectively use the tools and ensuring that the technology aligns with the organization's strategic goals. The text concludes that a balanced approach, combining human expertise with advanced technology, is key to achieving long-term success and maintaining a competitive edge in a rapidly changing market.

Electroacoustic music – repeatability and non-repeatability

Terminology

Today, in order to avoid any misunderstandings, we use the term *electroacoustic music* for all musical pieces created from recorded sounds. In the past there were many various terms: *musique concrète* (Paris 1948), *electronic* (Colonia 1952), *experimental*, *tape music*, *computer*, or *acousmatic*, and the more recent *sampling*, *remix*, *noise*, *damaging*, *laptop orchestra*, *live electronics*, *fixed media* as well as many, many others. Some of these terms refer to aesthetical intentions, some to the technology behind creating sound or the compositional technique, and some to the presentation method, nevertheless each one widens its scope over time.

Sound art, understood literally, is understood very broadly, but one of its sections should be music as a (special) form of sound art. Actually, *sound art* does not always use electronically supported sounds, but in order to make this article more comprehensible, the electronic section of *sound art* will be automatically understood as *electroacoustic music*. This also encompasses the sphere of acoustic music that is transferred in the form of a recording.

Wikipedia¹ – list of definitions of the term “reproduction”:

1. Reproduction – the biological process relating to all living creatures by which new “offspring” is produced by the “parents”;
2. Reproduction – constant replenishment of means of production in order to keep continuous production;
3. Reproduction – restructuring something in the memory as an element of the process of reminding;

¹ <http://pl.Wikipedia.org/wiki/Reprodukcja> [accessed: 3 December 2013] – [translated from a Polish site with Polish definitions] – it is interesting to note that the Polish Language Dictionary PWN (edited before the Internet era) quotes a similar definition but in a different order, starting the list with reproduction as a copy and a recording, it leaves the market issues as the second to last item.

4. Reproduction – (reproductive, reproduce) – reproduction of humans as a process of reproducing population structure and numbers, connected with the number of births and deaths;

5. Reproduction – a copy of the original made in any scale by printing or photocopying.

Introduction

Though it is little remembered, electroacoustic music was created, among other reasons, to make the composer once and for all completely responsible for the entirety of his or her work. Thanks to this every performance could be identical with the original and free from the performer's influence, e.g. the performer's own interpretation, momentary state of mind and, first of all, imperfection or lack of ability.

The prototypes of devices for recording sound were first created in the second half of the 18th century. The 1960s and 1970s were an era of the race to obtain a patent; it was won by Edison (patent in 1878). Several decades earlier the daguerreotype allowed, in the same direct way, to record an image. Taking a look, though it may be a superficial one, at the history of civilisation, we can see a constant yearning to capture reality, record it, duplicate it and repeat it in different circumstances: in song, writing, woodcut, print, photography, recording and, today, also as a broadcast. We shall add to these various ways of fulfilling this need the cutting off of enemies' heads in order to obtain their power. The first ethnographers came across plenty of obstacles on their way to capture an image of the tribes being analysed, as capturing an image was often misunderstood as taking a piece of the soul away. The reaction of the large audience gathered at the World Expo in Paris in 1889 after the playing a recording of chancellor Otto Bismarck's voice was similar. Is it ("only") about the stolen soul or rather the intuition of faking reality?

Reproduction of a sound recording by definition occurs in a new time, new space and new circumstances. Besides, each reproduction contains defects, e.g. omissions, deformations and shortages with respect to context, time and compliance of place, spaciousness, emotions of the audience or technical copying accuracy.

1. Reproduction as a psycho-acoustic phenomenon

Reproduction – restructuring something in the memory as an element of the process of reminding [Wikipedia]

All works of art are perceived individually based on one's own, individual feelings and experiences. We listen to music by constantly comparing it to the rhythms of our own organism and with emotions that were experienced before as a result of analogical influences. We recall those emotions and their circumstances and connect them to the music currently

being played. We also subconsciously make various comparisons in individual pieces of music. Our short-term memory works at full speed and allows us to recognise returning motifs, to track the flow of processing the work or even to capture the architecture of the piece. As a result of various composing procedures, the sound of music causes the tension of expectation or solution in relaxation through fulfilment or surprise. Some people like predictable music, others prefer a composer to lead them through unknown paths, yet others are only prepared for consumer-like utilisation of music (and the art of sound in general) as a tool, e.g. as an acoustic background isolating them from surrounding sounds (e.g. music for work, for sleeping), a rhythmic sound accompanying physical activities (for dancing or for synchronising group physical work), or as a declaration of individualism or group identity (mobile phone ringtone, anthem). Some sets of sounds are only supposed to carry a sentimental, informational or documental value (e.g. *field recordings* or concert recordings, though of course this is not their only purpose). Sometimes the technical quality of the reproduction flattens all values of the message only to be an information-reminder message (e.g. when people listen to Tchaikovsky during a fast ride in a convertible car they only remember parts of the melody which, based on limited amounts of data, is reconstructed from the memory).

The act of listening is in each case connected with memory and experience – individual features which are not objectively present in the sounds themselves. Sound reproduction in each case must respond to the different expectations and needs of the client, including their individual psycho-acoustic and erudition connotations.

2. Reproduction as multiplicity

Reproduction – a copy of the original made in any scale by printing or photocopying [Wikipedia]

2.1. Recording accuracy

Probably most everybody understands the difference between a Caravaggio painting in an album from a real Caravaggio painting in a Roman church. It is better to see the album than nothing at all, although we rarely understand the differences in colour, size, brightness, method of light reflection, surface condition – all of which are the domain of important aesthetic impressions. “The Last Supper” is known by most people from the chromolithographs that were given away as a keepsake of one’s First Communion. Probably 98% of those people are not aware of what kind of painting that is, who painted it and when, or even that this was indeed a painting in the first place. Perhaps only one person out of several thousand saw this fresco in Milan before and after the last maintenance repair and noticed the huge differences, i.e. differences in expression.

A piece of art as an artistically complex form of expression is not suited for reproduction, is exceptional, unique, sometimes brilliant, and always non-reproducible. Reproduc-

tion techniques have their limits and hopefully they will never reach perfection. A promise of such perfection was supposed to be represented by digital technologies.

Music, as long as it operates as musical notation, leaves a margin for interpretation by another performer. Recorded music does not need a performer any more – at least that seems to be the case. Music recorded digitally may supposedly be impartially copied endlessly – at least this is also the common understanding.

Nowadays, digital technologies relating to the image or sound are developing so quickly that a great film about the natural environment made ten years ago, with great pictures and huge scientific value is impossible to watch because the image resolution is too low. Very few people want to go to the cinema to see a black-and-white movie. We do not listen to symphonic music recorded in the 1960s because, although the conductor and the band are exceptional, the microphone setting is too close (to simplify things). And, at the same time, we watch the best films ever on the small screen of a smartphone or we listen to a jazz piano player using small earphones during a train trip. The purposes tend to be not only aesthetic but also cognitive.

Recording accuracy is still far from ideal. One hundred and forty years of phonography is an impressive road of development from the point of view of progress in accuracy. In each decade, recordings seemed to be “almost real,” but, as we know, “almost” makes a great difference. Mentally interesting from this point of view was the moment of transfer from analogue technologies to digital ones. All of a sudden many people forgot how burdensome the “hum of an old record” was, as well as the unavoidable hums of a tape, amp player, etc. The listener and, for other reasons, the producer were delighted with the silence that had finally been achieved – which was soon considered unhuman, digital silence – and digital sound was considered cold and soulless. Today it is even more different than it used to be. Some people remember and love 8-bit sound, although the current minimum standard is 24 bits. Recorded at 192 kHz frequency, we feel that it reminds us of analogue recordings and at the same time we listen mainly to MP3 players with almost one hundred less frequent sampling. The difference is similar to that between an image photographed with digital zoom and real optical zoom: pixelosis or the highest (currently, temporarily) quality of a large format image in a cinema or Ultra HDTV. In recording digital sound the thing to remember is the number of measure points of sound parameters in each second of the recording and the different break-filling algorithms between such measure points existing on the market. If we measure sound parameters at 196 thousand times per second, this definitely seems to be incredibly much. But the human ear turns out to be a much more precise and demanding object if it can still hear the difference in comparison to the same sound recorded in analogue technology (a constant stream of data ensuring full registration of curves in real time instead of registration of data only at measurement points and with the space between points supplemented artificially post factum).

In the case of the cheapest mp3 (transfer speed of 64 kbps), measurement is made 22 times less frequently than in the case of the same sound on a compact disc (1411.2 kbps). However, thanks to this “saving” one can produce much cheaper devices for music playing,

transmission and storage. It is sufficient to look at the capacity of a stereophonic sound file: 1 GB equals 2083 minutes (over 34 hours) for mp3 64 kbps, and only 14 minutes for WAV 24-bit 192 kHz. If one adds to that very cheap earphones or loudspeakers, which are miniature, true, but with a playing accuracy similar to what was available one hundred years ago, then we come back to the situation of a recipient who listens to music only to remember it and not for the sake of aesthetic impressions.

It is very moving to recall the 8-bit sound of old computer games, but if we want to have a recording with a relay resembling authentic sound, then 24 bits is the absolute minimum, and only with 32 bits can one obtain relative reliability. These bits also condition the feeling of sound depth and spaciousness, and they guarantee recording dynamics (gradation between silence, a pin falling on the floor and a landing plane), therefore, they also ensure a certain loss margin in the case of further sound processing. None of these features is provided by fast (therefore superficial) Internet transmission or a record copied on a computer.

2.2. Reproduction as duplication

The sharpness of a digital record only apparently guarantees full compliance with the original. During data transmission some data are left out (for various reasons, but mainly to reduce costs) and then are digitally reconstructed (or not) when played. Again, one may recall the difference between image enlargement modes and pixel multiplication algorithms. It is worth doing an experiment and listening to the results: we take a CD with piano music, with the recording made at a concert (*live*) and the record published by a well-established company with a world-renowned reputation – and we copy it onto a computer. Even copying it 1 : 1, i.e. in the time period that is equal to the concert's duration, we will still probably not hear any difference. But after copying it at a speed of 2 : 1, the concert hall will seem much smaller and the instrument quality will sound worse than a Steinway and move in the direction of a home piano. A copying speed of 50:1 will only leave us with a mere reflection of real music, not preserving anything from the concert's emotions, impressions connected with the atmosphere, the aura of the concert hall, instrument quality, etc.

Copying sound in the analogue era was a nightmare for sound experts. Each copy, each mix and any necessary mid-mixes reduced technical quality as it copied (with losses) the musical contents and additionally boosted the humming noises of the media carriers. The continuous lack of methylated spirit to clean the heads of tape recorders, tape grain-ing (as in the case of photographic film in the past), particular rules and the finesse of editing taking into account the pace of tape rolling, struggling pre-echo (magnetic self-copying to adjacent rolls) or other "hygienic" actions of a "pencil sharp" recording, as well as the general feeling of value and mastery of the craft are nowadays all issues connected with nostalgic recollections of the past.

We know similar problems from the domain of graphics. It is not without reason that in workshop graphics (proprietary, artistic), subsequent copies are numbered and the matrices which are used are destroyed. If anyone has had an opportunity to see at the same time several copies of, for example, the same Japanese woodcut made at different times, they must have noticed how significant the differences are as a result of using a delicate matrix, the more or less visible wood grains, the texture of the paper used or the different hands making the retouch.

Sound, before reaching the audience, is also exposed to various deformations due to many intermediating panels, e.g. recording and playing devices and, in particular, the undervalued sockets and plug-ins and all types of cabling, and, finally, interior acoustics, i.e. those co-operating and interacting with sounds coming from the loudspeakers.

2.3. Reproduction as time mastering

Recordings help preserve great artists and politicians over time. The democratisation of access to recording equipment also facilitates in preserving an aunt's birthday or the sound of the sea. People who make recordings have various motivations, also, anticipated time perspectives connected with playing the recorded moments are different. There is only one thing that connects them – the possibility of being able to play the recording later or in the future, and the fact that it is repeatable and (although not fully) reproducible.

We record fragments of concerts, we transfer them to the Internet and we never listen to such recordings ourselves again, but we have an honourable purpose – we share our recordings with others. Musicians record their rehearsals to analyse them in a few hours and to correct things they did not notice before, and then they delete such recordings. In many ways we turn back and “scroll” through time, e.g. when learning foreign languages with the use of recordings. We register our acoustic surroundings and soundscapes to preserve the beauty of nature and to use such recordings later as a sort of self-therapy. Conscious enthusiasts record the sounds of objects that are becoming obsolete and the sounds of animals which are becoming extinct. Professionals record the words of politicians, celebrities, concerts, and documentaries of various events. Some of these recordings will only be shown once on television, some of them will be introduced into the commercial sphere in material form (e.g. CD) or in virtual form (an mp3 to be bought in the network). Some of them will probably end up stuck somewhere in the drawers of various editors, either lazy or forward-looking ones. The latter will take out their treasures after many years have gone by and will be able to produce, for example, a documentary showing the development of an artist over several decades. Searching through official sound archives does not give such results because the catalogues of recordings do not possess this special type of long-lasting memory and the gift of synthesis, i.e. they do not say anything about human reactions of sympathy, admiration and appreciation of the recorded people and events, about supporting a given cause or path for many years.

Recordings of people who have passed away as well as the sounds of old objects or soundscapes acquire after many years a historical, sentimental and usability value. They turn out, for example, to be very valuable and indispensable for the needs of adding sound to films telling old stories (the clash of halberds but also the sound of an old cash register). There are archives specialised in collecting these types of sounds for the needs of the motion picture industry. Others facilitate in reconstructing soundscapes because they registered (sometimes accidentally) the animal sounds of a given ecosystem or the acoustic soundscape of civilisation sounds in a specific place. Nowadays we reconstruct historic monuments and we furnish their interiors with furniture reconstructed on the basis of old photographs, soon enough we will start much more frequently to use recordings for the needs of reconstructing the audiosphere. There are Internet sites devoted to birds, some of them with a decent scientific background, and professional recordings of bird voices constitute their important element. Many countries present recordings of their historical heroes or political speeches of key historical importance on the Internet. Sites connected with the movie industry or music publishing houses feature catalogues of music fragments related with various emotional feelings. These examples can go on and on, and still there will be many more tomorrow.

There are many stories about pirate recordings of concerts from as early as the 1960s, and such reprehensible practices turn out, after many years, to be a valuable supplement in an artist's documentation. In small shops at museums one can find recordings for connoisseurs. Several years ago the oldest piano recordings were published in a digital format (since the end of the 19th century), e.g. with Scott Joplin playing his ragtime melodies, Claude Debussy, Rachmaninov or Stravinsky. For a more hermetic circle of an audience, a CD was issued with digital transcriptions of Japanese music from the years 1901–13 which was preserved on wax rolls collected by Berliner Phonogramm-Archiv. Each collector finds such curios, but first of all someone must have decided that it made sense to preserve them.

The circulation of recordings falls out from under the control of the people who make them or, on the contrary, it becomes a consciously distributed product in line with a carefully planned strategy.

There is also a virtual sphere of sounds that is transferred through time. Many people can recall their childhood for a moment under the influence of a sound's impact. The simplest example is the subconscious response to a sound resembling the chime of one's grandmother's clock which we never hear later. It is similar and equally emotional with reactions to smells, for example, the smell of bread that used to be baked at home. All of this occurs most often in our sub-consciousness. It is a characteristic feature as to how poor our vocabulary is in that respect. In the common language there are no words to describe sounds and smells. We cannot describe "what" a sound (smell) is, as it is slightly easier to define what a given sound resembles. When we find such an expression in our private vocabulary, we can use this to consciously bring back old emotions.

The importance of the technical aspect of reproduction as mastering the time flow is undervalued – it is about storing and maintaining recordings.

Recordings can be stored for long time. Also, in this respect certain conditions have to be met. At present, models developed by the sound archive of the British Library are highly respected in Europe.

The process of discolouring photographs is also connected with magnetic tapes. Just in case, recordings from old media carriers are transferred to more modern ones. The originals, however, are always kept and used to make subsequent conversions to the parameters of a more modern generation. It is the original and not the technologically younger copy which constitutes the reference point in each case.

Conversion is rather a translation to new sets of parameters than a copy. It always means losses. It is easy to figure out that recalculating the value of 44100 Hz into 48000 must lead to an approximation in the counting. Between the numbers 16, 24 and 32, simple proportions occur, but much more complex ones arise during the recalculation of, e.g. different standards of kbps values. All conversions and applied codecs require recalculation and approximation. There are different recalculating algorithms and each of them means losses and additional problems (e.g. *dithering* or wrong interpolation).

“Improving” the quality by increasing the frequency of sampling, resolution or transfer speed is an illusion. Similar problems occur during supplementation of pixels in more and more modern generations of television screens, or in digital zoom in photography.

An optimum data carrier for current sound recordings has become DVD-Audio. It records sound in a multi-channel mode (e.g. octophony) in resolutions of up to 192 kHz, 24 bits, and it reaches dynamics of up to 144 dB. Recording on a CD is only stereophony of 44.1 kHz and 16 bits, which means that the recording dynamics reaches 96 dB.

More and more perfect methods of sound recording require increasing CPU computer power and larger memory cards. The latest can store up to 50 TB (PCD – with protein layers) or 3.9 TB (holographic HDV). Luckily, the physical size of these devices is not large and is subject to constant miniaturisation. However, broadcasting stations still keep in their records kilometres of magnetic tapes, rolls of which stored in boxes 40 x 40 x 2 cm still occupy much less space in archives than initial recordings made on wire rolls.

2.4. Reproduction as an attempt to conquer space

2.4.1. Change of distance

The microphone perfectly manipulates space. It is sufficient to understand how a singer sings when at a concert he or she moves close to and far away from a microphone stand and how he or she sounds when he or she moves a microphone around his or her mouth (which also means around all the other objects on the stage).

The microphone decides about the persuasion force of a sound message. Placed close to the mouth (like a phone) it allows the speaker or vocalist to silence the voice,

change its tone and create a feeling of physical closeness with the recipient, as well as familiarity and intimacy. We need this feeling constantly, as it drives the conditioned response (Pavlov response) to answer a ringing phone (promise of closeness), or to talk to a person sitting on the other side of a table. A person speaking to us on the phone has a greater force of persuasion, and we better treat a person talking straight to our ear than a person who has come to us personally but is speaking to us from a one-metre distance. That is why we are so eager to switch on the radio or a TV in an empty apartment, because a radio or TV speaker becomes our private, gladly welcomed, personal guest.

This phenomenon was first used a long time ago for political propaganda purposes. It shall be further discussed in Chapter IV.

2.4.2. Change of scale

In the world of sound, unlike in the world of images, a change in scale means loss, apart from the aesthetical value, also of the information value of a recording. Music registered from the wrong perspective (e.g. changing the scale because of a wrong microphone setting – the audial effect of “fish eye”) lacks many aesthetical values and loses the persuasion force of the artistic message. However, music is a convention and we can support the current perception with our hearing experience. At the same time, the information value is entirely lost if there is a change of scale in *field recordings*. A microphone recording the sound of a cricket must be at the same distance from the insect as the human ear. When we move the microphone too close (or too far), recipients will not be able to recognise the cricket and will easily mistake it for a creaky wardrobe door (or the sound of the sea).

A microphone carries each time the risk of changing the scale of a sound phenomenon. Flat-sounding music cannot be improved in a studio. Recording with several pairs of microphones with different distances from the recorded object and recording the sound on separate paths allows the creation of an adequate mixture only after the recording, in the silence of a studio, with the right to make attempts and mistakes which can be improved even after many years.

It is worthwhile here to quote a definition by Moholy-Nagy, dated 1922²: “reproduction as a reiteration of already existing relations,” in which the focus, indicating on the core of a reproduction, is placed on reduplicating relationships and not objects.

2.4.3. Representation and simulation of space

The spatial aspect of electroacoustic music has probably been one of the two most important research areas in recent years. Leading research centres are dealing with work

² Quoted from *Moholy-Nagy*, ed. by K. Passuth, New York 1985, p. 289; orig.: “László Moholy-Nagy Produktion-Reproduktion,” *De Stijl*, no. 7, 1922, pp. 97–101.

on either the representation and simulation of space or on humanised interactive systems. As can be easily seen, this second stream relates to issues of transmission in real time (*live electronics*); we are, however, interested in the former, referring mainly to projection, i.e. to reproduction along with new spatial distribution of recorded sound (*fixed media*).

The exploration of spatial issues started to intensify in the 1970s (preceded by the individual artistic actions by, e.g. Maderna, Varese or Stockhausen in the 1950s). At present, the results can even be seen in the furnishing of concert halls, as a multi-loudspeaker *acousmonium* has become the standard.

The original assumption of newly established specific music and electronic music that the performer-interpreter should definitely be excluded from the triangle of composer-performer-recipient turned out to be a utopia. The quality of recorded sound available at that time and the parameters of reproduction devices concealed awareness of the acoustic reflection phenomenon. Increasing the quality of the recording and the playing equipment facilitated in gradually focusing the attention of artists and researchers on phenomena of dislocation and spatiality.

It seems obvious that our bathroom singing, in a small flat, in a meadow, in the mountains, carries different tone features each time. Interaction also takes place with the prevailing acoustic conditions, i.e. we model our voice differently when talking to someone in the hall of a flat and differently when continuing a dialogue from across the two separate banks of a river.

The sound from loudspeakers in concert halls also sounds differently in each case because of the new acoustic settings, and it requires adaptation. Even the highest quality loudspeakers from top manufacturers differ in their parameters. First of all, however, the acoustics of individual concert halls is different. It is influenced by the shape and size of the hall, air humidity, the raw materials used for the interior furnishing, the upholstery and many other factors, including factors that are unpredictable during rehearsals, such as the number of people in the audience and what types of attire they are wearing.

Reproduction of an electroacoustic piece in a concert hall requires adapting the music to the hall's existing acoustics. The same recorded piece of music will sound differently in each hall, as each individual sound wave is absorbed and reflected differently (which means that reverberation is different). Also, the configuration and type of equipment for playing music has different features each and every time, even the pace of tempo of the knob and slider reaction is different. During a rehearsal, music needs to be technically adapted to all of this. The adaptation requires a separate, long rehearsal, it is time-consuming and especially undervalued by third parties (e.g. concert organisers).

If instruments are also used in the presentation of an electroacoustic piece, then perhaps their sound should be enhanced, slightly reverberated, and definitely the mutual dynamic proportions of instruments and loudspeakers should be matched. Besides, the whole thing is even more complicated since there is a need to make a spatial diffusion adjustment, either to improve the spatial proportions or even to create this space in "live" conditions (e.g. proprietary interpretation of the sound director, "transcription" from

a stereophonic version into an octophonic one, adaptation to the acousmonium). In Belgium, there is an annual competition for young sound operators creating their own interpretations of classical electroacoustic pieces. First, just as in the case of a Beethoven piano sonata, one rehearses such pieces in a studio and then comes in for the competition and fine-tunes the interpretation at rehearsals in a concert hall. And it seems that it should be enough to just click “play.”

In each situation, performing the role of a sound director at a concert requires many different corrections (made during rehearsals and additionally adjusted on a current basis during the concert with an audience). Specific models of sound cards cause the reduction of sound noise at the highest frequencies, as most loudspeaker models have insufficiently flat characteristics, and in a hall there are crystal chandeliers resonating with specific sounds, in the depth of the stage there is a long empty space or there are velvet curtains – all of this can be adjusted at a console and other devices during a rehearsal before a concert. Sometimes, for artistic reasons, a temporary increase in a specific frequency band is useful, or a short-term change in loudness, or other nuances, but the need for such adjustments may come up only in the presence of an audience, which slightly modifies the hall's acoustics. Everything is decided upon *via* the reflex, taste, experience and creativity of the sound director on a current basis.

Some concert halls are famous for great acoustics for orchestras but, e.g. chamber music sounds less attractive in them. Sometimes the audience is satisfied with the sound quality, but the musicians on stage do not hear one another. There are halls in which recordings are made very gladly, as the halls feature some special value connected with natural reverberation.

We remember the times when a concert was recorded by one pair of microphones hanging over the stage. Nowadays, there are many more such pairs. Each of them makes a recording in different proportions of the direct sound from the source (instrument) and the sound returned from the walls. Only during studio processing are appropriate proportions selected between individual pairs of recording. Sometimes the purpose is to reflect as much as possible natural hall acoustics, and sometimes it is done for artistic intentions.

Microphone distribution during a recording is an art in itself. Some settings use the natural acoustic conditions of a hall, some give them up (or even choose the conditions of a recording studio) and make up for them with electronic manipulation. The acoustic values of a hall decide about the use of a close plan microphone, recording instruments from a relatively short distance as well as microphones referred to as “support stands” which capture primarily various sound reflections; the proper sound proportions are selected only during studio editing.

Reverberation is just like the weather – it is either good or bad, but it is always there. If it is not properly captured during a recording, then it is added in the studio processing process after making all other necessary adjustments. Reverberation, be it natural or artificial, smoothens sounds, consolidates them, helps in creating perspective and builds up the emotional message. The reflection of sound (called reverberation for the needs of simpli-

fication) is of various types. It depends on the hall's parameters but is closely connected with, among others, the pitch of individual elements (simple tones) of a single sound, the direction and power of its emission, and the different behaviour of acoustic waves of individual constituents of the sound spectrum. Therefore, the number of factors (and their interactions) is so large that we are unable to measure all of the occurring relations and processes. Whatever is already measured can be copied. That is how artificial reverberation has been created. Especially at an earlier stage or in cheap devices it tends to be obtrusive and crude, often "wiry" in perception. The most famous reverberation device (Lexicon) offers several thousand different effects in the form of pre-sets, and each of them can be further individually modified. The sound director is an artist who has invaluable influence on the final shape of a recording. The proposal to introduce reverberation coming from a sampling and the currently quite popular IR (*Impulse Response*) turned out to be interesting. To put it simply, it can be described as capturing, e.g. a hand-clapping sound in a given acoustic space, where the core and the usable part of the recording are not a sound object (the clapping hand), but the way its sound waves move in space, return from various obstacles and get absorbed by them. At present, such reverberation is available in commercial software not only in editors (*Peak*, *Sound Forge* and others) and sequencers, but also in software for live electronics (e.g. *Waves IR-Live*).

Of course, IR, just as any other reverberation added to a recording, constitutes some sort of falsification of the original space and leads to the generation of a new space; all of this acquired data comes from a reality that is different from the one featuring a given object.

Composing electroacoustic music can be, in a certain simplification, brought down to two strategies, i.e. working with sound objects which are precisely located and work focused on spatial relations. In unsuccessful realisations a sound object becomes identical with a physical object – the loudspeaker as its localised source.

Both strategies and their consequences belong to the sphere of composing aesthetics rather than in the workshop area. They are entirely different, also in composing for traditional instruments, e.g. by offering a more important role either to objects (e.g. chords and their harmony) or spatial relations (e.g. the same chord in pointillism builds colours and not harmony). They relate to choice, not quality.

In electroacoustic music, additional decisions are needed with respect to the selection of adequate technologies. Besides, an electroacoustic piece composed in an object-based strategy is relatively easy to translate from, for example, a stereophonic version to a mix 5.1, as important features of the composition will be preserved. Of course, it is possible to destroy a composer's idea with wrong mixing or if this task is left to automated procedures, which are now plenty in number in commercial software. In a "spatial" strategy, translating a composition from the language of space, e.g. from eight-channel to stereophonic, is practically impossible, and first of all, it is futile since the core idea of a composition is based on composing spatial relations, and not only objects.

This would be similar to moving massive pieces of furniture commonly known as “Gdansk wardrobes” from a spacious castle into a small apartment in a block of flats – the objects would no longer be beautiful as the relations between them would become overwhelming and too dense. Objects (also sound objects) are not balloons which can simply lose some air to return to adequate distances between them; there must be an appropriate scale of space between them.

A third path has appeared which allows for such “air releasing,” i.e. rescaling objects together with relations. It is called *ambisonics*. The technology started being developed forty years ago, but artistic productions have only started to come up in greater numbers in the last ten to fifteen years. In the most simple words it can be described as a flexible method of space reconstruction. It facilitates, quite successfully at this stage, space simulation that is entirely different from the one in which we currently listen to music. It requires very time-consuming rehearsals before a concert, but also the result is much better than for the other solutions. Spatial projection allows for very precise sound motion in space (of course, depending on the number of loudspeakers), for acoustic illusion that is entirely different from a situation in which a listener exists physically, for the presence and possible sound motion not only horizontally (even directly in front of the listener), but also vertically (which requires entirely different spectral activities), and first of all for greater adaptation flexibility with respect to existing acoustic conditions. Ambisonics uses various sorts of reverberation (e.g. IR that was referred to above), spectra procedures, and special methods of space coding during recording or the synthesis of sounds.

Many scientific publications on the *ambisonics* system are available on the Internet. Also, the software is easily accessible, also free software. In the Max/MSP environment such software is, e.g. *Spat~* by IRCAM, *Holo-Edit* and plug-ins made available by ICST from Zurich.

Although *ambisonics* constitutes a new opportunity for creative reproduction and simulation of space, the highest authority is still the sound director, whose artistic activities make a difference with respect to the whole work.

2.5. Concert music, music listened to from recordings

For the needs of simplification, let us adopt the term *recorded sounds* for all sounds that have been recorded or generated electronically and/or are transferred electronically with the use of loudspeakers or earphones. Thus this term covers all records in any form with music, concerts of electroacoustic or noise music, Internet transmissions, phone ringtones, computer game sounds and all other sounds which require electric support.

Today most people spend most of their time in contact with recorded sounds but not those transmitted directly by the source. In the youngest group age, in cities, contacts with recorded sounds account for 90% of all hearing stimuli.

A concert reminds us of the primary essence of music, and the number of enthusiasts of “live” music confirms the special values and importance of the “here and now.” With full force it constantly emphasises the balance in the opposition of evanescence vs. repeatability vs. multiplication (reproduction).

Also, artists performing at concerts mobilise their artistic efforts differently than in a recording studio.

This is well illustrated by the following quotation:

Jan Błaszczak: The music performer live reminds us of our transience. The contrary with recordings – digital in particular, which can be rewound, stopped and manipulated. Perhaps this is the reason behind digitalised music’s success? It gives us a feeling of power over time.

Anna Chęćka-Gotkowicz: Lévi-Strauss calls music a time-killing machine. And he adds that the listener’s time gets stopped, folded and frozen in the musical experience, like a cloth carried by the wind. Thanks to that we experience something like immortality. Musical time plays with us, buys time, delays what is wanted and inevitable. A listener falls into that game and experiences carelessness. In a slightly different context, this game is played by the performer when, like Gould, they try to deceive Chronos. Recording sounds creates the illusion of mastering time. On the other hand, if we came back to this source form of music making, which is performing music live, then this would make us realise the most how fragile and ephemeral music is. The sound which we create here and now is doomed to vanish. It is the one-off nature and unrepeatability of a music event connected with the feeling of responsibility for the time offered us by listeners, which is probably one of the most important sources of stage fright. A performer knows that all of his or her activities are of the one-off nature. Music and life are the same.³

A concert with improvised music additionally enhances the feeling of evanescence and uniqueness, as such is the nature of not only music performance in general but of improvisation in particular. An additional value of the concert, which we are not aware of, is a sort of simultaneous breathing of the listeners and musicians, the possibility to watch the players and to read their body language to visually support our hearing perception.

An atavist mechanism of associating sounds with their source applies in this case.

For thousands of years we have listened to sounds, seeing their cause at the same time, or we guessed the reason thanks to our life experience. Only after the phonograph was discovered did it separate sounds from the source and start a mental revolution. Nowadays, if we hear a plane sound in the open we look up to the skies, but in a cinema when we hear a plane we cannot see on the screen we respond not by looking up but by a subconscious visualisation and by expecting to finally see the plane on the screen. This process is referred to as mental dislocation. We connect the storm sound not with a loudspeaker but with the storm itself, although it may not even be shown on the screen. That is exactly why – using the phenomenon of the “audio-visual contract” – the cinema is considered to be a “dream factory.”

³ From Jan Błaszczak’s interview with Anna Chęćka-Gotkowicz [online], June 2013, available from: <http://www.t-mobile-music.pl/opinie/wywiady/ukosne-brzmienie-poltonu,13272.html> [accessed: 3 December 2013].

Earlier hearing experiences influence our perception. This is a characteristic situation with the lion roar in animated films for small children. A sound which is supposed to raise fear achieves the intended result only with children who have already seen a lion before in a zoo or in a nature documentary. In the case of other viewers, especially when played from poor loudspeakers, this sound causes laughter (and destroys concentration, “proper” film perception, reliability of the characters, etc.).

The phenomenon of mental dislocation has facilitated the emergence of *acousmatic music*. This is how commonly such music is referred to which is only presented with the use of loudspeakers, without the presence of any visual elements. The essence of this term, however, is the sound content, in which none of the elements is associated with any known source which could produce such sounds. For some people such music is difficult to accept, it causes a feeling of mental discomfort and disorientation; for others it turns into a fascination with the mastery of sound art. Sometimes, when listening to something some may feel physical discomfort, e.g. a listener who cannot visualise the source of a sound perceives sounds only as a physical ‘massage’ with pressures coming from the acoustic waves. But even such perception processes have their admirers, so in this area of acoustic massage other genres of music and art of sound have developed (to mention only *techno* or *noise*, and also symphonic music overusing low sounds).

3. Reproduction as a product

Let us look at the remaining three definitions as suggested by Wikipedia for the term “reproduction” by referring them to digitally recorded sounds from the point of view of their author, i.e. sound designer, sound director and composer.

3.1. Reproduction – constant replenishment of means of production in order to keep continuous production [Wikipedia]

It is surprising that, for example, Onet⁴ only quotes one definition of reproduction:

Reproduction, production understood as a constant, continuous process.

The need for reproduction is caused by repetitiveness of almost all human needs, the satisfying of which conditions the entire production process. In the long term, reproduction has a wider nature, which means increasing the real production volume, capital expenditure, equity, employment and other economic categories characterising the economy and conditioning the growth of the gross domestic product (GDP) and the well-being level of societies ...

⁴ <http://portalwiedzy.onet.pl/53863,,,reprodukcja,haslo.html> [accessed: 12 December 2013].

Repetitiveness of almost all human needs also relates to the need for listening and being listened to. The phonographic market will be able to satisfy these needs endlessly.

3.2. Reproduction of humans as a process of reproducing population structure and numbers, connected with the number of births and deaths [Wikipedia]

Nature does not accept a void (at least on our planet). If this definition is treated as a metaphor, then it means that we have just reached a situation where products of the phonographic industry collected for 140 years fill up our acoustic eco-system fully. Genres of music fight one another and stretch in this ecosystem. When there are no current candidates to be the stars of pop music, their places are taken up by music from the 1970s or any other. Music which due to its essence cannot be multiplied gets pushed aside into the niches, such as jazz music, improvised music, folk music and any other music based on individual interpretation and the unique celebration it creates around itself. The market is trying to capture even those aspects by overusing terms such as "charismatic" or "cult." Only the insiders know that this is a far cry, as far as between a real Leonardo and a chromolithograph, while clients will never know that anyway (unless by accident, which would then change their lives). This *continuous process of reproducing numbers* continues – the show must go on.

On the other hand, *the process of reproducing structure* is not continuous. Although Poland started to shape its music market to resemble the Western market relatively late, even here one can see that instead of a global village there is growing differentiation on the market, the number of genres is rising and the niches for them become more and more narrow. This relates to both music based on beat (reluctantly called commercial) and music shaped on entirely different rules than the constant presence of rhythmic pulsation.

If a recording has become obsolete for technical reasons and that is why it stops raising interest (demand), the recorded artist is immediately forgotten and his or her place is taken by an epigone because it is worth it (it pays back) to at least imitate the values of the original. That is how genres get reproduced – this often means their degeneration, although luckily there are always also creative individuals.

3.3. Reproduction – the biological process relating to all organisms by which new offspring is produced by the parents [Wikipedia]

In each area of creativity there are two strategies in place, i.e. copying the "recipe" from a piece already accepted by listeners or creating something new each time.

We do not only bring life to children but we also raise them. This is often done “naturally,” mechanically, and in a way that copies old traditional models. A conscious parent adopts a slightly different strategy – he or she raises his or her first child with a child-raising manual in hand, and each subsequent child is raised differently, with the parent wiser thanks to previous experiences, more and more impatiently (the instinct of passing on the best features), and finally even carelessly sometimes, believing in interactivity rules (children raise each other).

In the case of the composer this is quite similar. One may compose the same song for one’s whole life, music for TV series, or music that is full of pathos and patriotic cantatas (sometimes with elements of moral blackmail), for years living off of one success, as people only like songs they already know. You may also tread a path full of attempts and mistakes, burdened with responsibility, the risk of failing, the possibility of artistic satisfaction, the hope of finding at least one listener, the joy of an artist at the news of their painting being stolen.

New technologies supporting music composition or sound creation multiply the number of emerging sound phenomena but do not increase the artistic value. The common availability of these technologies results in a flood of clones of similar sounds, as amateur creation in electronic music rarely exceeds pre-sets of synthesisers and programme plug-ins or automatic procedures of commercial software. You cannot raise personal expression using only “ready” material. On the contrary, the sampling of borrowed sounds in itself already starts to lead to homogenisation of the entire audio-sphere. This is just like building a villa with a swimming pool out of Lego bricks – you still see mainly the Lego bricks, and not everybody can be the next Zbigniew Libera.

4. Reproduction as a form of political manipulation

Recordings manipulate reality. In general, they are supposed to make life more beautiful, but they can also be used for wrong intentions. It is enough to recall selected examples.

The possibilities offered by playing music in a new space and with a changed distance to the listener (see Chapter II.4.1.) were used by Goebbels for the needs of Nazi political propaganda. A tape recorder already existed in Germany in the 1930s, but this invention was kept secret almost until the end of the war due to its immense propaganda value. Speeches and mass meetings were recorded and their power of persuasion was reinforced and multiplied thanks to radio retransmission. A radio receiver was at that time a focal point in homes, and the Pavlov reaction to the voice heard from a close distance, in one’s own home, among one’s family members, raised in listeners the feeling of the speaker’s direct presence, a close relationship with him or her, cordiality, and granted them a credit of trust.

The time transfer made with a recording was used in Poland during the September campaign of 1939. The President of Warsaw, Stefan Starzyński, recorded his patriotic

speech encouraging people to stand against the Nazi invaders and Poles heard it on the radio on 11 September when, according to his orders, he was supposed to be on his way to Romania.⁵ A recording of this speech was preserved on Decelit records (now also available on YouTube), paradoxically moving this political act into times unplanned for this – into contemporary and current political demand and the historic perspective of those events.

Recorded or synthetic sounds are emitted for various purposes connected with security. These may be the sounds of predatory birds (the imitation of a soundscape to scare off animals that are unwanted in a city or at an airport), synthetic sounds used in military operations (less known phenomena and psycho-acoustic processes) or specific frequencies emitted from a generator to end city riots (a somatic phenomenon of one's own resonance frequency).

We all know about the existence of eavesdropping and spying devices, of political and social-political scandals caused by such devices, and secret documents publicised on the Internet, e.g. by Snowden. The already common availability of miniature microphones and recording devices makes us all face new ethical situations on an everyday basis.

The broadly discussed rights to participate in culture, juggling terms such as Copyright, Free Software, the Copyleft movement, CC (Creative Commons) type of licences, GPL (General Public License), the flow of these discussions and negotiated solutions, and in particular the methods of stimulating negotiation, apart from the issue of access to culture, are all connected with the political situation and interim targets of governments, and are different in various countries.

Final comments

We record and replay the sound environment (regardless of whether it is natural or musical), and possibly we also reproduce (multiply) recordings and distribute them in order to create a document (memorial), to learn, to share emotions, to make a profit, to promote, popularise, propagate, and also to manipulate or damage (propaganda, blackmail, political and military tasks). Recordings satisfy our emotional, aesthetic and cognitive needs.

Each of these tasks has developed its own specific behavioural norms (e.g. social acceptance), specific laws (e.g. copyright law, regulations on a film's loudness norms, the night-time quiet period and public order disturbance), social rules (in particular those dominating in the Internet), and technical norms (e.g. standards of recording dynamics for different media, loudness classes of household goods).

All of these norms are in a constant clash with reality. It is not certain how important the technical quality of a recording is in the context of perception, especially since even phonograph rolls made people happy by allowing them to recognise the content; although

⁵ President Starzyński stayed in Warsaw and was arrested by the Germans on 27 October 1939.

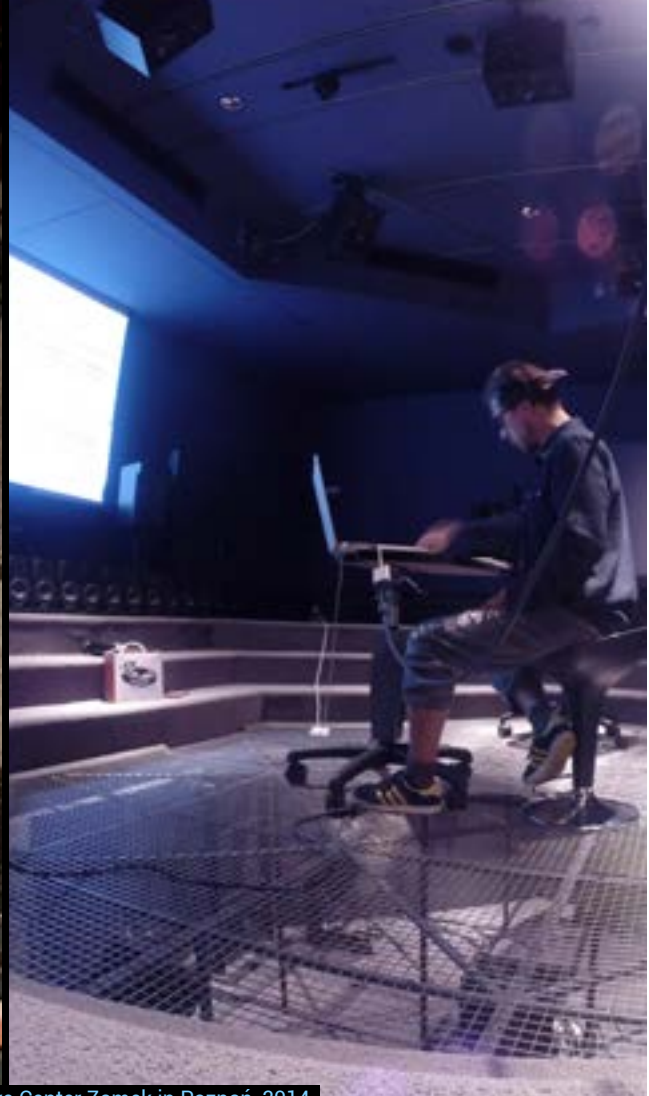
from today's perspective it seems that they only satisfied cognitive needs but not aesthetic ones. It is not certain how far we can go in the compromise between price and quality in the future, especially that very often we choose convenient and tiny earphones to listen to music instead of audiophile equipment. It is not certain when and why we need a full spectrum of sounds, especially when only a recognisable rhythmic scheme or a melody line contour seems absolutely enough.

Due to the number of aspects it is impossible to set borders between sound reproduction and imitation, a fake, plagiarism, a clone, counterfeit, a replica, copy, a translation, transcription, a paraphrase, travesty, and even parody.



Dodecaudion, panGenerator (Piotr Barszczewski, Krzysztof Cybulski,
Krzysztof Goliński, Jakub Koźniewski), 2011-2012





Sensorium, Rafał Zapala, Culture Center Zamek in Poznań, 2014



The influence of technological revolutions on the strategy of sound organisation

Music is a resounding metaphor of reality; a reality we can recognise here and now, in each of its physical, metaphysical and emotional aspects. Each change in the paradigm of world perception, whether in terms of colloquial beliefs or science and humanities, is an inspiration for innovative methods of sound organisation. Each change may result in new music. This drives the need among avant-garde artists to search for the “new.” A popular allegation against fetishising “novelties at any cost” is false when we start looking for non-typical strategies of sound organisation and try to update our way of describing the world.

Music is a metaphor of reality also because composing is an extremely practical task. It is not without reason that we talk about a composing “technique.” It will not do much to write musical notes on a staff if one does not know the specific nature of an instrument (whether acoustic or electronic), its structure, the differences between individual makes and traditional playing habits. This is often technical knowledge regarding the mechanical aspects of instruments. In this context an orchestra resembles a small factory. Nowadays, when we live and create by using an expanded sound universe¹ – *de facto* each sounding object or sound environment is of interest to us as an instrument and as a potential and possible component of our technique. This, then, makes a composer study reality carefully in its most modern scenes.

This text is about the current, technical aspects of a changing world which, in my opinion, have a significant influence on music composition strategies. From the perspective of a composer I want to focus on two phenomena which seem to me to be particularly interesting. These phenomena are about composing with new instruments as well as the interactive connection between acoustic and electronic music.

¹ A term connected with the view that all sounds surrounding us account for music material of high value.

Revolutions of the past century

The inventions of the 20th century have proven how strong an influence technical changes can exercise on the art of sounds. It suffices to think about music at the beginning and at the end of the previous century. Classical examples such as the microphone, tape recorder, synthesiser, loudspeaker and, finally, computer are not only new musical tools, they are, in the first place, new strategies of creating, performing and listening to music.

The microphone has facilitated in hearing the world better in every detail. Just as the microscope did, it helped to extract new sounds, thus enriching our world of sound. The attention of artists was brought to micro sounds, murmur and hum, and accidental sounds, which had until then been skipped and marginalised.

Amplification in connection with the possibility of making recordings has become a milestone in musical arts and has generated an avalanche of new practices. *Musique concrete*, *object sonores* by Pierre Schaeffer broke the barrier between the so-called "musical" and "non-musical" sounds, thus entering the process of hum emancipation and expanding the colour palette. These devices sealed a change in the way of thinking about musical material, which is nowadays not only represented by the so-called musical instruments but by all sound artefacts of the surrounding reality. It bore fruit in the form of completely new areas of musical creation, such as, among others, acousmatic music,² tape collages, art of soundscape, field-recording and the stream of sound ecology. A composer could become independent of the differences in performance by recording the final shape of his or her work directly on the media and by playing it from loudspeakers without the involvement of the performer. Recording sounds separated them from the context in which they had been created. Previously, in order to listen to opera music, one had to go to the opera house, and highlander music could only be heard in a highlander village. The tape recorder facilitated the introduction of various types of music to various phenomenological contexts. It allowed the staging of music against certain types of a defined background, and also the opposite, i.e. in composing while taking into account such a background. Anybody who has ever listened to music with the use of earphones when walking down city streets knows how strong such context mixing can be. A microphone and a loudspeaker have changed the existing "balance of powers" on stage. Nowadays, one can successfully compose for smaller instrumental sets, achieving similar dynamic effects which had previously only been possible with a huge symphonic orchestra.

An electroacoustic studio, i.e. a modern composing workshop, has become invaluable for the work of composers. It has offered huge opportunities for working with sound, for the so-called studio-based composition based on new methods of processing, mixing and material evolution over time and against the domain of sound colours.

² This term was first used by Pierre Schaeffer and stands for electroacoustic music presented only with the use of loudspeakers, i.e. without the involvement of performers.

The analysis of sound structure has brought focus on the microcosm of its internal structure. New techniques of sound synthesis are still some of the most dynamically developing areas of contemporary music. Moreover, structural sound models shape the way of thinking about musical composition. Working in a studio blurs the borders between the micro-level of sound design and the macro-level of sound composition. Finally, structural compliance of both levels is possible; "The new structure of composition is therefore born from the elementary structure of sound material."³ This entirely new composing strategy influenced very strongly, among others, the way of composer thinking in the 1970s (this refers to the Spectralist movement).

Composing with the use of a computer (*Computer Assisted Composition*) changes instrumental music; it transfers composing techniques known from electronic music to orchestral composition. Operations such as delay, reverberation, filtrations, mixing, reversing and looping, but also the analysis of spectral models or application of algorithms have been introduced into composing techniques for good. Popularising the looping technique has turned out to be particularly meaningful, as the loop has fundamentally changed popular music.

Studio techniques have also led to a new approach to time – they eroded linear music composition. Mixing, editing, switching, extending and reducing, sound reversing, playing sounds at different paces, cut'n'paste – many of these techniques have caused sustainable changes in the way composers think. Even technical defects have become an inspiration as material of the so-called *glitch* aesthetics (also understood as a metaphor for social changes, indicating the value of mistakes and errors in the comprehension process, in knowledge acquisition and, generally, in human development).

NIME: New instruments

Technological changes are the reason for a very strong tendency nowadays to make one's own instruments. Such a need among composers was already noticeable at the beginning of the 20th century. Breaking away from the "dictatorship" of generally available and substantially used up tones of a symphonic orchestra or ethnic music was connected with the search for a new musical language and formal strategies. Preparation – initially linked with the activity of John Cage – made artists aware of the fact that the process of designing the individual aesthetics of a musical piece may or even should be started with the moment of making an instrument. Many years later, Helmut Lachenmann said that "to compose, it means to make an instrument."⁴ Expanding musical material *via* particular sounds brought composers' attention to sounds available in everyday life, and as a result to the

³ Gisele Brelet in Fubini Enrico, *The history of musical aesthetics*, Kraków 1997.

⁴ Helmut Lachenmann, "About composing," *Glissando*, no. 4, 2005, p. 38.

possibility of making their own instruments.⁵ New instruments were created in the 20th century mainly as a result of the development of electronics. At the beginning these were pioneer activities, over time they were connected with research studies at universities or commercial companies. Interestingly, many of the developed instruments were an electronic imitation of their traditional versions – which eventually did not contribute much to the art of composing itself. Truly meaningful was the invention of those instruments which resulted in entirely new approach methods. A good example was, among others, the synthesiser, which brought the attention of artists to the internal composition of sound. Sound synthesis (nowadays frequently defined as sound design) gave composers the possibility to fully manage its microstructure; it also brought up the idea of rescaling this structure into the harmony of the entire composition.⁶ The opposition also became important, i.e. harmonic sound versus hum as a new idea of consonance and dissonance. Also, the approach to time changed. Both extremely short sounds were possible and those which never end (e.g. an oscillator may generate endless sounds).

New composing concepts were also brought up by the sampler, allowing artists to make any possible combinations of sounds originating from different acoustic contexts and using fragments of previously recorded music as new musical material. A musical quotation evolved into a phenomenon of sampling. The technique of looping fragments of music was also extremely fruitful – which led to the creation of many new musical genres. Revolutionary tools of this type facilitated in noticing the fact that new instruments could generate absolutely new musical phenomena, or new composing strategies.

A real acceleration, however, is connected with digital technology. It started at the end of the 20th century and is still growing. An important catalytic converter of the movement of designing new instruments has been the environment of the NIME conference (New Interfaces for Musical Expression).⁷ This is an annual meeting of sound artists, improvisers, designers and scientists.⁸ The conference's huge influence has been proven by the fact that new instruments have started to be recognised as NIMES.

To compose, it means to make one's own instrument. Perhaps my ... observation would sound more convincingly as: "to compose, it means to make one's own instrument and play it." At the same time, it is about such an intensive exploration of its time and sound qualities, so that not only the relationship of sounds but also the relationship of movements could become a function of this imagined instrument.⁹

⁵ Simultaneously, a consequence of these needs was the development of new, so-called expanded playing techniques on traditional instruments.

⁶ A classic example is shown by the first electronic compositions of Karlheinz Stockhausen, e.g. *Studie I* and *Studie II*.

⁷ The Internet site of the conference: www.nime.org.

⁸ The Internet site of the conference organisers: <http://www.nime.org>.

⁹ Lachenmann, op. cit., p. 40.

The above-quoted phrase brings attention to the meaningful fact that a new instrument, and a digital instrument in particular, also requires entirely new performance practice. Making such an instrument usually covers two basic stages, i.e. designing an interface and designing a sound source (e.g. in the form of a computer program, a synthesiser, etc.).¹⁰

Controllers

Since the beginning of digital technology there has been a tendency to use intuitive, generally available tools as music controllers, such as a mouse, computer, keyboard, trackpad, game drivers and a tablet. The MIDI standard, developed especially for music purposes, brought up a wide range of controllers. Initially, they were created as electronic imitations of acoustic instruments, i.e. they imitated keyboard, string, wind or percussion instruments.

The image displays a musical score for the piece "Poster" by Rafał Zapala. The score is arranged in a multi-stem format, including parts for el_s, el_ob, vno II, cl, el_B, vln, vcl, and compenet. Above the score, three control methods are indicated with arrows: "controlling with MIDI knobs" points to specific notes in the el_s and vln parts; "controlling with computer's keyboard" points to notes in the vno II and vcl parts; and "controlling with computer's mouse" points to notes in the el_B and vln parts. The score includes dynamic markings such as $T[rdm]:0.5$, $T[rdm]:0.8$, $D:100$, and $D:1000$. A section of the score is marked with a repeat sign and a first ending bracket. The bottom right of the score includes a "compenet" part.

Fig. 1. Rafał Zapala "Poster" – fragment of a music score with the use of a mouse and computer keyboard

However, what is important is the moment when the imagination of artists started reaching outside of the metaphors of traditional instruments by using new technology solutions; for example, wireless D-Beam controllers appeared, operating in infrared mode (similar to the Theremin's instrument in operation), the laser controller by Bernard Szajner

¹⁰ Simultaneously, there is a public discussion on the liquid borderline between the proper instrument and its interface.

(laser harp),¹¹ the *Meta-instrument*,¹² which was one of the first interfaces controlled by gestures, or a percussion controller operating in 3 dimensions, i.e. the Radio Button¹³ by Max Mathews. Over time, all types of sensors started to be used to control musical processes, e.g. motion sensors, touch sensors, tip, light, infrared, ultrasound (sonar) and other types of sensors.

At present, a particularly interesting practice is the interactive connection between acoustic instruments and electronic technology. This may take on different forms, e.g. hyper instruments (Tod Machover, MIT, IRCAM), or traditional instruments equipped with different types of sensors. This may also be the use of an acoustic signal to control the data, and then the microphone capturing the sound becomes a controller, which makes this practice very "musical." A real merger of acoustic and electronic music streams is promised by the technique of processing acoustic instrument sounds with the use of a computer. I shall describe this in more detail further on in the text. Nowadays, for music purposes more and more often research in the area of the so-called Virtual Reality is used. VR is used in games, medicine, military simulators, etc. Advanced controllers are developed in this respect, e.g. often haptic¹⁴ controllers (gloves, overall suits, stereoscope head display sets). Of course, all new achievements in this area quickly reach the composing studio.

Other types of music controllers are connected with research referred to as *Computer Supported Cooperative Work* (CSCW). Its characteristic feature is the possibility of operation by many users. Controllers of the *tabletop* type and multi-touch surfaces allow for controlling instrument data by many people simultaneously, which allows joint development of the final sound characteristics. Instruments such as Audiopad, ReacTable,¹⁵ reacTIVision, Thunder + Storm have become particularly popular. It is amazing to note that, for example, reacTable technology is publicly available on the Internet; it is well described and easy to use for self-performance and application.¹⁶

Another area of experiments with music controllers is the analysis of motion in space. It may relate to human motion, e.g. motion of the hand, eye lid or whole body. In such a situation the performer becomes a controller, the driver. For this purpose, various tech-

¹¹ An example of laser harp usage: <http://www.youtube.com/watch?v=UNNb8NYIG1w> [accessed: 11 October 2013].

¹² A description and concert on that instrument: <http://www.youtube.com/watch?v=ihjfYwolx6w> [accessed: 11 October 2013].

¹³ Video documentation in which the author Max Mathews explains the instrument operation details: <http://www.youtube.com/watch?v=3ZOzUVD4oLg> [accessed: 5 July 2013].

¹⁴ Haptic technology (from the Greek word απτικός /haptikos/ meaning 'touch') – uses mechanical means of communication with users through the sense of touch using changing forces, vibrations and motions. Haptic (touchable) features of objects may refer, for example, to porosity.

¹⁵ A set of films at the producer's site: <http://www.reactable.com/community/videos?p=0&view=None> [accessed: 5 November 2013].

¹⁶ Description of creating one's own reacTable: <http://building-a-reactable.blogspot.com> [accessed: 5 November 2013].

nologies may be used, e.g. infrared, ultrasounds or change analysis with motion tracking. In the *colour tracking* technology, and in the control driver function, one can use a colourful stain contrasting with the background,¹⁷ or light moving in the darkness.¹⁸ Huge progress in technology of motion reading has been noticed in recent years along with the development of popular game drivers, e.g. Nintendo, Wii Remote and Kinect. Immediately, they started being applied in proprietary instruments and sound installations.

The fascinating concept that the sole emotions or intentions of a performer, in the form of bio-physical reactions of the human organism, should directly influence music has been known for a long time. Another area then relates to work connected with biofeedback technology.¹⁹ A classical composition in this respect has been *Music for Solo Performer* by Alvin Lucier. Since that time, biofeedback systems have developed substantially and, just as all advanced technologies, they have started to be used in everyday life, among other places in psychology, medicine or parapsychology, but also in sports or business. This is also a therapy method which consists in providing patients with feedback on changes in the physiological condition of their organism, thanks to which they can learn to modify functions which are normally not consciously controlled, e.g. brain waves, electric resistance of the skin, muscular tension, etc. In this area, controllers defined as brain-computer interfaces (BCIs) are available, and also systems such as BodySynth, Bio-Muse and BioFlex have been developed. Many other relatively simple systems have also found their application in musical compositions.

The latest areas in terms of development of musical instruments are mobile technologies and GPS. Mobile phones and new generation tablets have very quickly started playing the role of classical controllers (MIDI is more and more often replaced by the new data transmission system OSC²⁰). Nowadays, phones are small computers, so slowly they are taking over some of their functions (they can already act as virtual instruments, effects processors, samplers, etc.). Also, the tendency has grown to use them as a location source in large areas (e.g. in cities). The motion data of these objects account for a new type of huge controller, e.g. they are read, among others, with the use of GPS technology.²¹

Initially, work on new musical data controllers was mainly connected with the activity of well-established research studios. Units such as Studio in Cologne, IRCAM (Institut de

¹⁷ This type of technology was used in the work of the author *Where is My mind !?! Part 2. Fish(ask?)*, where red fish swimming in an aquarium acted as a controller in a sound installation <http://vimeo.com/75094369> [accessed: 10 October 2013].

¹⁸ An example is shown in the work of Marek Chołowiecki, e.g. *WYSYG* (1989), *Beauty and the Beast* (1991), *Sha Ba Del'Mana* (1994).

¹⁹ *Biofeedback*, which means biological feedback loop – consists in providing a human with feedback on changes in his or her physiological condition.

²⁰ *Open Sound Control* – a new system of communication between musical devices, developed and popularised at the CNMAT and IRCAM institutes (<http://opensoundcontrol.org>).

²¹ An example is shown in the work of Marek Chołowiecki from the GPS-Trans cycle (<http://gps.art.pl/frog/>) [accessed: 1 July 2013].

Recherche et Coordination Acoustique/Musique in Paris), EMS (Electronic Music Studios in London), CCRMA (Center for Computer Research in Music and the Arts at Stanford University), STEIM in Amsterdam, CNMAT (Center for New Music and Audio Technologies at University of California at Berkeley), MIT in Massachusetts or SARC (Sonic Arts Research Centre in Belfast) still deliver new instruments.

A real revolution, however, is the fact that the technologies as described above have today become generally accessible and relatively cheap. This facilitates their usage in private composer studios. This is connected with the widening idea of DIY (*Do It Yourself*)²² and the open software movement. More and more often, low-budget electronics under the brand of Arduino²³ show up in musical studios. These possibilities change the operations of the composer, who often starts work on a musical project from designing and making an instrument. This practice shows that on such work the borderline between a technological experiment and music composition is becoming blurred. Both of these aspects take place simultaneously and influence each other. Moreover, the composer is often also the performer of his or her compositions – the only virtuoso of his or her own instrument. Here we have the question whether this is a positive or a negative tendency? The strength of the composition for traditional instruments is their repeatability, the possibility of being performed at any place by any performer, which helps in a production's distribution. Work binding so closely the composer-performer with the instrument is obviously bound to cause less impact. Besides, it is difficult to talk about virtuosity that is typical of acoustic instruments, backed up by many years' practice, an educational system, or notation.

I think, however, that the movement connected with developing new instruments shall grow and start to influence the image of music creation. I believe that after the period of jumping at new possibilities, the next stage is now needed. What I mean is that it is necessary to quit one-off developments, i.e. technological novelties in favour of consistent, complementary creative strategies. Techniques based on a truly unique approach to sound organisation should include a new instrument, new performance practices backed up by education and should result in full composition cycles; then their real impact on the development of musical arts shall be possible. I would like to describe a proposal of one such strategy in the next part of this text.

“Live” electronics

I have mentioned the importance of the musical studio – it is both an instrument and a composing technique, i.e. a place for experiments, research, attempts and the final touch

²² The idea of DIY has been popularised by technology lovers, hobbyist electronics hackers who make films and instructional procedure descriptions available at their sites and on discussion fora.

²³ Arduino is a *hardware/software* platform with an open structure for developing prototypes of interactive electronic systems. It is particularly distributed in robotics and artistic activities (<http://arduino.cc>).

of new compositions. This phenomenon in itself is an example of a technological evolution, and of course a generator of new composing strategies. A studio facilitates in using almost all currently available scientific achievements and artistic strategies. Studio development is a perfect reflection of the changes that have taken place in technology over the centuries. Initially, these were rooms full of expensive, stationary devices of large dimensions. Nowadays, most technical possibilities in the audio domain fit into the average laptop and into a backpack. Moreover, a significant part of processing processes, analysis, synthesis, editing or composing is possible today in "live" form, in the practice of *live electronics*. We say that the laptop has become a new instrument. This statement is to a large extent insufficient. In the technical aspect the laptop encompasses the possibility of using all currently available and future achievements, which can now and will in the future be offered by electronic music. The consequence of its usage is a new direction in arts – *ars electronica*. I do not intend to claim that laptop music shall replace music played on acoustic instruments – although I think that even nowadays it acts as their symmetrical counterweight. I do believe, however, that the merger of both of these (slightly antagonised today) media is eventually inevitable.

Acoustic music is strongly rooted in tradition, and electronic music is focused on experiment. In situations where both of these areas depart a third path is needed, i.e. their interactive connection. This is a warranted interaction since the mutual relationship between acoustic and electronic practice is extremely fruitful at a conceptual level. Hums, the weight of sounds, microtones, spectralism, accident role, aleatoricism, editing, defects, interactivity – most of these new concepts overlap and mutually influence one another.

In the previous part I mentioned the *live electronics* technique in which the sound of an acoustic source is electronically processed with the use of a laptop.²⁴ I perceive such a technique as a special sort of instrument preparation, i.e. preparation with the use of electronics. The essence of classical preparation (with the use of objects) was to enrich an instrument with new sounds, to expand its tone possibilities. Such a role can also be exercised by electronics interactively connected with the acoustic source. I have previously mentioned the need to define changes in thinking about music with the use of precise strategies, e.g. composing techniques. In this respect an example may be a special type of *live electronics*.

I would like to suggest for this the name of *Live Electronic Preparation* (LEP).²⁵ Such a technique is today becoming a successful bridge between the old and the new, between the real and the virtual – mutually enriching in an interactive relationship. The electronic processing of acoustic sound in live mode is also a logical and natural consequence of the development of last century's performance techniques.

²⁴ To be more precise – with the use of a set of devices, e.g. a microphone, sound card, computer and loudspeaker.

²⁵ An attempt of a full description of the LEP technique as a consistent composing and performance method is included in the author's publication: "Live Electronic Preparation: Interactive Timbral Practice," in *The Oxford Handbook of Interactive Audio*, ed. by K. Collins, B. Kapralos, H. Tessler, New York 2014.

Source

The starting point in the LEP technique has always been acoustic sound. The term “acoustic” (sound, instrument and music) originated as an opposition to “electric,” i.e. it means those types of sounds which are created without the use of electric energy.

In acoustic instruments we may track the history of human civilisation and all aspects of human culture. A musical instrument is an object for performing music, even if initially it was meant for different purposes. It is an artefact often developed and improved by generations of professionals working on subliming its qualities. Perfect construction proportions, material types and production technologies all contribute to the fact that we do not want to forget about them. An instrument itself is one thing, but what is also fascinating is the playing technique mastered along with technical development. Artistry in its production was improved along with the development of each human culture. All acoustic instruments, be it orchestra, ethnic, old and contemporary, may act as source for the LEP technique.

However, an acoustic source of contemporary compositions may also be any object generating sound. Similarly, one may treat all sound surroundings. This way each acoustic sound which may be intercepted with the use of a microphone becomes the source of the LEP technique, and along with that all the wealth of acoustic music culture. It would be a pity to give up so many possibilities, especially since recordings of acoustic instruments are a great source of material for studio work. This results from the many advantages of natural sounds, which normally have a rich internal structure. It is very dynamic in its development over time. Besides, it changes with different performance techniques, the play dynamics or interpretation of the performer. Such wealth is extremely difficult to achieve in purely electronic music.

Electronic processing

In the LEP technique an acoustic instrument signal is “prepared” by the use of electronic means. The acoustic note – a complex and dynamic spectral-time construction – is the material for processing in a computer program. It is live material, constantly evolving, shaped dynamically and artistically by more or less sensitive performers. The processing algorithms also react then to changes in the source sound, flexibly following the performer’s interpretation.

The amplification itself is a form of processing and may act as a creative composing medium, e.g. in the form of strong sound amplification of very silent, humming sounds inside the instrument, extracted as if to the level of our hearing possibilities. It is natural to transfer studio DSP (Digital Sound Processing) techniques. Traditionally, they are divided into those relating to time and those connected with the sound and its combinations.

Among the constantly growing processing possibilities, Curtis Roads²⁶ names the following as basic:

- processing dynamics (shaping the envelope, hum reduction, various types of compression)
- filtering
- convolution
- fixed or variable *delay*
- re-tuning and pace changes
- reverberation
- spatialisation (emission of sound in the space around).

Also, more popular are more modern actions, such as granulation or spectral edition. What is important is that all traditional techniques, i.e. the new ones and those which will come up in the future, may be used for processing in LEP technology.

Specialist issues relating to the LEP technique which have not been discussed in this article relate to the use of microphones, data interpretation or advanced sound projection (e.g. types and setting of loudspeakers).

Composer

The term “composer” must be expanded nowadays. Also, the strategy of sound organisation needs to change. The area of work of a composer creating in the LEP technique is growing. A necessary element of the composer’s technique today is the issue of commanding both the acoustic and the electronic medium as well as their integration. Of course, all to-date skills connected with traditional instrumentation, traditional and contemporary performance techniques shall remain important. Also, the ability to use electronic tools becomes important. This is needed, if not for anything else, then at least to understand changes in musical paradigms, which often exist in a strong relationship with electronics. But not only. The expertise of a contemporary composer should cover, besides the ability to operate basic music programs of the DAW type, at least basic programming skills (e.g. in environments slowly setting the standard, such as Max/MSP or PureData, Supercollider, etc.).

Work on LEP composition is of an interactive nature and takes place at several levels which are linked and connected with one another:

1. Idea of the work: composition in the internal memory, auditory imagination, concept.
2. Acoustic score – in the traditional way of thinking this is a set of commands and information for the performer (regardless of whether this is Western music notation or the notation schemes of other music cultures, contemporary instructions or graphical sym-

²⁶ Curtis Roads, *The computer music tutorial*, Cambridge, Mass., 1996.

bols). This stage of work relates to composing for an instrument, immediately taking into account, however, the planning of electronic processing. The result is the music score – often a draft score or outline and presented in general form. Cooperation with an instrumentalist is very helpful in this respect, and it becomes indispensable at the next stage.

3. Recording – in the initial recording of an instrumental piece it seems necessary to work with electronics. Even if this is not the final version, this is material for precise composing with a computer program.

4. Electronic score – the computer program:

The next stage is working in the studio. Nowadays it has become a standard to write a computer program, e.g. a dedicated *patch* closely connected with the form of a piece. If the score is a set of commands for the performer, then we are dealing here with a set of commands for the computer – in this respect we define a computer program as a new form of the music score.

5. Interaction – comparing all of the stages which evolve dynamically and influence one another. At this stage we face the fine-tuning of both scores, i.e. the acoustic and the electronic score.

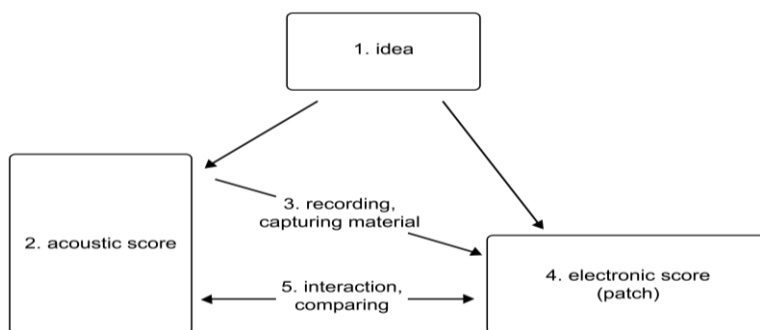
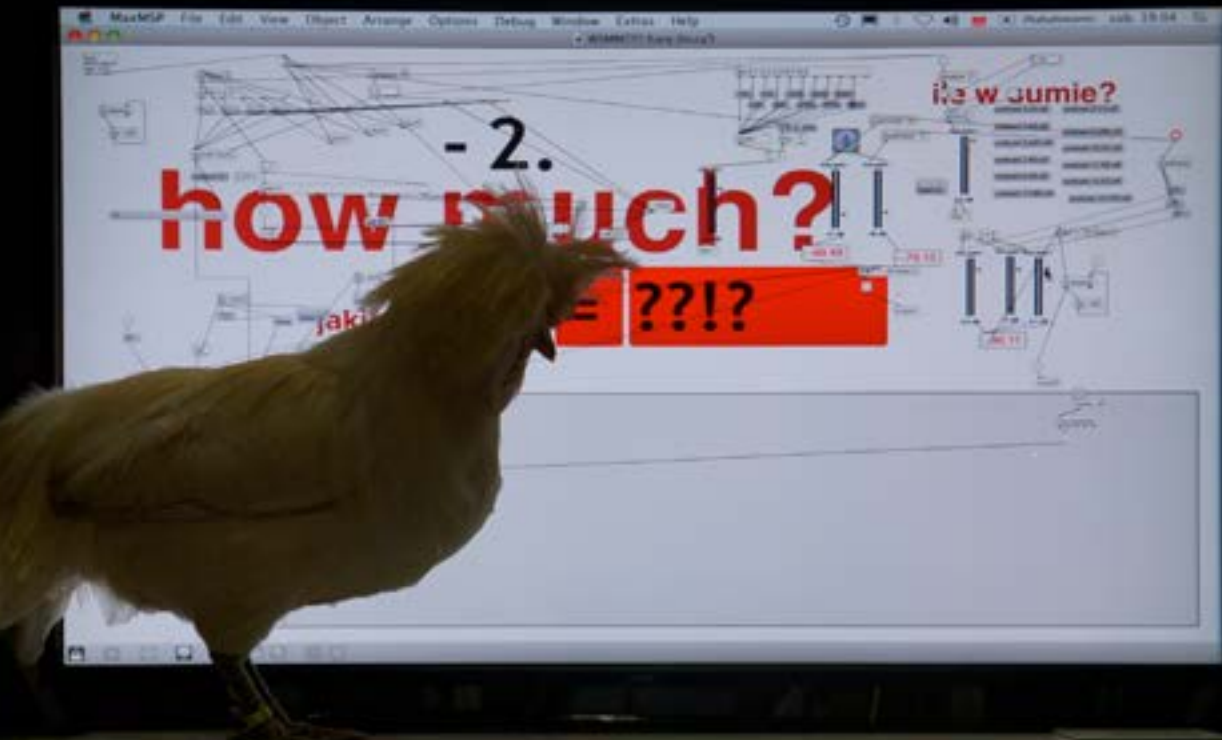


Fig. 2. Strategy of working with the LEP technique

The stages of work most often overlap and interactively influence one another. A composer must be aware of all the stages simultaneously, imagining acoustic sounds (e.g. plucking a piano string with a finger when the pedal is pressed), its processing (e.g. retuning the pitch connected with growing reverberation), or achieving the effect of moving away, or *glissando*, which is an effect that was impossible to achieve previously with the use of the piano. At the same time, one must take into account the performance and technical practice (e.g. the right leg presses the pedal, the left leg forms the support for the standing musician, the right hand “plucks” a string, the left hand turns the controller’s knob), so that a piece can be well composed and performable. Also, a new form of notation

is needed, i.e. the instructions for the performer. It is therefore clear that a composer's work results from two elements, i.e. the acoustic score (a set of commands, the notes with graphical instructions for an acoustic instrument) and the electronic score (a functional computer program, a *patch* written for a specific musical piece which is integrated with its form). I want to emphasise clearly my approach to this issue – I believe it is obvious that writing a *patch* in a musical programming environment is a new form of composing, and a program is a new form of the score. Composers should include this new aspect as a standard in their education. Just as the traditional score is a set of commands and information for the performer-musician, so the score-program is a set of guidelines for the performer-computer.

As one can see, such a situation in which everything is new – the technology, instrument, performance practice, score – entirely changes the approach to creation. All of these issues must now be of interest to a composer deprived of support provided by traditional practice. Composers, separated from their pencils and staves, integrate art, science, technology and the social sciences in their work. All of these aspects become the composing of new music.



Hens (count?), Rafał Zapała, *Transnature Is Here* exhibition, Malta Festival, Poznań, 2013



Fish (ask?), Rafał Zapała *Transnature Is Here* exhibition, Malta Festival, Poznań, 2013



***Mapping Chopin*, Paweł Janicki, from the WRO Art Center archive, 2010**



NEW PRACTICES IN TECHNOCULTURE

Agnieszka Jelewska

Bits, viruses, networks. Three cases of the latest Polish art:
Lisek/Brzeziński/Janicki

Robert B. Lisek

How does the brain work? Comments on mathematics and arts

Michał Krawczak

Media democratisation: Creative programming and the culture of makers



Bits, viruses, networks. Three cases of the latest Polish art: Lisek/Brzeziński/Janicki

Technologies and techniques of seeing, hearing and data transmission may be found in the most surprising places.¹

Many theoreticians of new media or philosophers of science emphasise that data translation, programming language and network forms of communication are the basic benchmarks for the contemporary paradigm of digital culture and art. The text explores this hypothesis in new contexts by way of linking three areas: science, art and philosophy. It refers to the following: examples from theory and experiments conducted in the sciences, the operations of Polish artists from the *art&science* paradigm area as well as selected tools and terms from post-structuralist philosophy.

A large part of the text is devoted to case studies from the domain of art, which directly indicate different methods and levels of establishing the relationship between the process of artistic creation and scientific experiment, between new technologies and methods of not just using them but rather deconstructing and fitting them into new social-cultural contexts. The works of Robert B. Lisek, Michał Brzeziński and Paweł Janicki are referred to here as cases: these are projects which do not fully fall under a linear description as using non-linear recording systems, mathematical language or genetic data; they are focused on processuality, on change and constant mutation. Simultaneously, it is worth looking at their presence at the borderline of artistic practice, theory and science as *case studies* – opening up the possibilities of exploring themes taken up by both artists and scientists, but also humanists, or in contemporary philosophical thought. The themes referred to in the text may then serve to further develop the ideas, concepts, languages and experiences that are raised and result from the work of those artists.

¹ Jussi Parikka, *Insect Media: An Archaeology of Animals and Technology*, Minneapolis 2010, p. XIX.

Mutation machines

A series of lectures which took place in 1943 at Trinity College in Dublin has significant meaning among many events and scientific discoveries which influenced the process of crossing the borders between the disciplines of the exact sciences and opened up new possibilities of developing life research at the level of data code. These lectures were conducted by the already then famous physicist Erwin Schrödinger. The phenomenon of those lectures, under the meaningful title of *What is life?*, consisted in the fact that the researcher suggested connecting research in quantum physics, mathematical theories and biology, thus making strong the hypothesis that life at a primary complexity level is based on a mutation of structures deprived of predictable reproductions, very similar to aperiodic crystals occurring in nature, the internal form of which can be described on the basis of chaotic molecular reactions. At the same time, Schrödinger tried to name (even before the discovery of DNA) the complicated dynamics of the organic cell code. Considering inheritance, in connection with mathematical concepts and reactions occurring in the world of quanta, he decided that describing, which means understanding, the mechanisms of life creation and development at the cellular level is a trans-disciplinary task undoubtedly connected with data mutation processes. There are, as he claimed, two methods of growing "small particles" in larger forms:

One is the comparatively dull way of repeating the same structure ... That is the way followed in a growing crystal. Once the periodicity is established, there is no definite limit to the size of the aggregate. The other way is that of building up a more and more extended aggregate without the dull device of repetition. That is the case of the more and more complicated organic molecule in which every atom, and every group of atoms, plays an individual role, not entirely equivalent to that of many others (as is the case in a periodic structure). We might quite properly call that an aperiodic crystal or solid and express our hypothesis by saying: We believe a gene – or perhaps the whole chromosome fibre – to be an aperiodic solid.²

Schrödinger, when analysing the works of Hugo Marie de Vries,³ indicated that gene mutations at the organic life level occur progressively and often "spontaneously" under the influence of various factors, such as "accidental fluctuation of vibrational energy."⁴ The aperiodic nature of crystal, which was for him a source or even the matrix of organic life, facilitates encoding a practically unlimited number of possibilities even with a relatively small number of atoms. Living matter, Schrödinger claimed, evades the thrust for balance,

² Erwin Schrödinger, *Czym jest życie? Fizyczne aspekty żywej komórki. Umysł i material. Szkice autobiograficzne*, transl. by S. Amsterdamski, Warszawa 1998, pp. 75–76.

³ A known Dutch botanist and geneticist who developed research on the theory of mutation and inheritance at the end of the 19th century.

⁴ Schrödinger, op. cit., p. 78.

which he defined as disorder leading to the death of the scheme. A guarantee of its survival is the fact that each living organism collects from its surroundings the so-called negative entropy.⁵ This was meant to be proof that life is rather connected with instability and chaotic movements than with ordering and schematic motion. Schrödinger gave his lectures at a time when counting machines, information coding and decoding systems (the theory by Shannon-Weaver⁶) and the coupled configurations of Norbert Wiener were being developed. But his bold concept at that time indicated the insufficiency of stable classical physics laws in the world of smaller particles and announced linking the experiences of many domains and new scientific discoveries,⁷ all of which added to rudimentary changes in understanding the world's construction and, importantly, the instability of structures which design our lives.

The Austrian theoretician also took one of the first steps on the way to showing that the mutation machine (for him a model of such a machine was represented by aperiodic crystals and the processes of progressive changes occurring within them) may in many aspects be unpredictable. Later research on data mutation led to the discovery of DNA, and then through transformations at the level of the exact sciences, also the humanities and cultural sciences reached for the mutation model and a discussion started, which has been going on for many years now, conditioning cultural research as a form of data mutation or as a set of transformed algorithmic procedures. Poststructuralist philosophy participated in that process very actively. The mutation machine became an important element for understanding translation mechanisms in the philosophy of Gilles Deleuze and Félix Guattari, i.e. the mechanical *phylum* (*machinic phylum*), as referred to by philosophers, has become a mutation machine which can connect, divide and copy various levels of reality as well as domains of knowledge and science. Therefore, by using a code, data transformation and information processes, changes can be made both at the molecular level and at the social-political level. In this broad spectrum of understanding a mutation machine, the mechanisms of reality may be considered as data translation which consists in launching software, writing the algorithms and protocols that are responsible for their further transformations.

⁵ Schrödinger, who was criticised for this concept, indicated later that negative entropy is not entropy accepted with a negative mark but rather a concept close to free energy. Free energy is that part of energy collected in food or stored in the organism which the organism can process into non-volumetric work.

⁶ This is about a famous publication entitled *The Mathematical Theory of Communication* which was published in 1949 and included the basics of information theory presented by Claude Shannon as well as an essay on that theory by Warren Weaver. This publication is one of the key works for understanding the role and function of mathematics in data transfer concepts, information coding and decoding. It is also worth remembering that for Shannon the meaning of information was relatively unimportant, it was the method of data recording which mattered. He wrote that information is closely connected with uncertainty and that it is entropy, which means a measure of chaos in thermodynamics. Schrödinger thought similarly when using this term.

⁷ Schrödinger's aperiodic shapes became an important source of inspiration for, among others, the biologists James D. Watson and Francis Crick, who then discovered the structure of DNA.

Art&Science

Contemporary art, in particular that which reaches for technological solutions and uses digital tools, also explores scientific theories. It experiments and often critically addresses new scientific discoveries, and in this way it becomes a form of meta language, i.e. it situates itself within a discussion connected with a broad spectrum of issues relating to the human and post-human condition, the situation of networked subjectivity, forms of mutation and transformations occurring at the level of organic life, and, as a result, it indicates their consequences in culture and society. Artistic operations are often close to theoretical considerations based on scientific concepts since they focus on the process, on examining phenomena and their possible social implications. From the algorists⁸ and interactive research on the relationship between a human and computer interface,⁹ or trans-species communication to genetic transformations,¹⁰ this art operates at the most primary code levels, currently facilitating the possibilities of translating various data to multiple systems and forms of presentation. The paradigm linking art and science has its sources in the search made by artists back in the 1960s and 1970s, when new technological tools came up but research also developed regarding the possibilities of linking such domains as information technology and mathematics, on the one hand, and biology, chemistry or neurology on the other.

One of the most important theoretical-historical works tracking this paradigm is the now-classic book by Stephen Wilson entitled *Information Arts* dating from 2003. In this book the author describes contemporary artists who took the effort to cross the boundary between art and science in the search for new forms of expression and to define such issues as the creation process, experiment, research ethics and tool development. Wilson puts forth the thesis that an artistic experiment also has a structure similar to that of a scientific experiment, and in both cases the search for new solutions is important as well as the process exploring boundaries and crossing them. At the same time, the author formulates important questions indicating a complicated network of relations linking science and artistic operations:

What kinds of relationships are possible among art, scientific inquiry, and technological innovation? How might art and research mutually inform each other? How are artists investigating techno-scientific research? How have they chosen to relate to the world of research? How does

⁸ Algorists (algorithmists) are artists using algorithms in their work, mostly in graphical form. In 1995 they set up a group with that particular name; they were, among others, Jean-Pierre Hébert and Roman Verostko.

⁹ Even the first projects from the 1970s by Myron Krueger, one of the pioneers of interactive art, envisaged exploring various possible forms of human-computer communication.

¹⁰ Today the classical works of Edwardo Kac, Victoria Vesna and James Gimzewski, the Australian group Symbiotica, the interactive works of Christa Sommerer and Laurent Mignonneau are only an introduction into the art domain in which there are many artists nowadays dealing with these issues at various levels and using many different development tools.

research further their artistic agendas? How do art historians and cultural theorists understand the interactions between culture and research? How do researchers conceptualize? What agendas motivate their work? We are at an interesting place in history, in which it is sometimes difficult to distinguish between techno-scientific research and art—a sign that broader integrated views of art and research are developing. ... Our culture desperately needs wide involvement in the definition of research agendas, the actual investigation processes ... Artists can significantly contribute to this discourse by developing a new kind of work models¹¹.

In the paradigm of *art and science*, one can place many artists of the second half of the 20th century and the new millennium, i.e. those dealing with bio and nano art, software art, graphical and algorithmic design, as well as many other forms. Linking and crossing borders between science and art is today becoming an important area of exploration, however, this is to a large extent possible thanks to the fact that the language of creation and experimenting in both areas is connected with the possibility of data translation and at that level serves to create a new quality, values or artefact. However, interest in operations, procedures and the smallest pieces of information, occurring both in the domain of the sciences (biological or chemical) and the arts, is also connected with new possibilities of utilising digital tools for discovering and mutating various layers and levels of life in techno-cultural structures of reality. "What we call reality," says John Archibald Wheeler, "results in the final analysis from asking binary (zero-one) questions." And he adds: "All that's physical has an information-theoretical source and that is what the participating universe is all about."¹²

Programming and developing algorithmic procedures at each level of knowledge, as Wolfgang Ernst claims¹³, influences changes occurring in cultural structures, which then become closer to the programming language. In such a context the universe resembles a gigantic computer – a cosmic machine for information processing. To define that situation Ernst uses the term "cultural engineering," and he defines culture as a language primarily determined by mathematics, codes, encryptions, data and formulas which exist in the network circulation. Only after descending to that level can one unveil what in his opinion constitutes the grounds for the epistemological shape of contemporary media-tised culture. In this context art often constitutes grounds for the exploration of various topics, fragments, experiments or tools which determine cognitive processes and experi-

¹¹ Stephen Wilson, *Information Arts. Intersections of Art, Science and Technology*, Cambridge, Mass. –London, England, 2003, p. 3.

¹² John A. Wheeler, *At Home in the Universe*, New York 1994, pp. 290-298.

¹³ Wolfgang Ernst is one of the more important contemporary German media experts dealing with the archives idea as well as historicism in the era of digital media. In his books, among others: *M.edium Foucault* (2000), *Das Rumoren der Archive* (2002), *Das Gesetz des Gedächtnisses* (2007), he has been developing the hypothesis proposed by Friedrich Kittler and he analyses new possibilities of shaping narration on media structures of reality. In his numerous lectures he even makes the point that *media studies* should return to the domain of the exact sciences since it is the language of mathematics which generates media reality as well as cultural and political reality.

ence in digital reality. From the perspective of cultural determinism, this type of analysis has been proposed by Lev Manovich. In his book, published on the Internet under the title *Software Takes Command*, he brings our attention to the new universalism of the present times:

Search engines, recommendation systems, mapping applications, blog tools, auction tools, instant messaging clients, and, of course, platforms which allow others to write new software – Facebook, Windows, Unix, Android – are in the center of the global economy, culture, social life, and, increasingly, politics. And this “cultural software” – cultural in a sense that it is directly used by hundreds of millions of people and that it carries “atoms” of culture (media and information, as well as human interactions around these media and information) – is only the visible part of a much larger software universe. Software controls the flight of a smart missile toward its target during war, adjusting its course throughout the flight. Software runs the warehouses and production lines of Amazon, Gap, Dell, and numerous other companies allowing them to assemble and dispatch material objects around the world, almost in no time. Software allows shops and supermarkets to automatically restock their shelves, as well as automatically determine which items should go on sale, for how much, and when and where in the store. Software, of course, is what organizes the Internet, routing email messages, delivering Web pages from a server, switching network traffic, assigning IP addresses, and rendering Web pages in a browser. The school and the hospital, the military base and the scientific laboratory, the airport and the city—all social, economic, and cultural systems of modern society—run on software. Software is the invisible glue that ties it all together. While various systems of modern society speak in different languages and have different goals, they all share the syntaxes of software ...¹⁴

Manovich uses the term “cultural software” as a form of shaping the language describing cultural and social activities. Taking the programming level and knowledge distribution methods out of the discussion of the humanities, social and political sciences in many cases forces researchers to describe only the surface of things, their cover, which means the “*output*” of processes occurring through algorithms which were invented for programming and designing networks. Algorithms become the basis for a contemporary understanding of the world, and the network is the category which envelopes yet broader semantic areas. We operate in a world of transcoded communication, in a network of various forms of living and non-living matter, in a reality of biological-information technology.

The radical thesis concerning research and understanding the contemporary roles of the media, which we find, among others, in the works of the aforementioned Wolfgang Ernst, who claims that algorithmic mechanisms are to a large extent programmed to steer knowledge and position it by mathematical calculations, is obviously also reflected in the arts. Operations, transformations and mutations, committed during artistic operations, are based on algorithmic transposition procedures, not on linear semantic sequences. “Trans-

¹⁴ Lev Manovich, “Software Takes Command,” [online], available from: <http://lab.softwarestudies.com/2008/11/softbook.html> [accessed: 5 January 2012].

lation," Jussi Parikka says, "is not a linguistic operation ... but a transposition, and even something more, an active operation on the levels of non-discursive media production."¹⁵ Therefore, such artistic actions simultaneously require new analytic equipment helping to understand the changes occurring within, not even aesthetic but mainly concerned with perception and epistemology in situations of never-ending data transcoding between network circulations of different topological origin. Multimedia, according to Ernst, no longer exist without time-bound algorithmic processes through which a transcoding process of practically everything occurs: sound, image, DNA fragments, and so on.

Case#1: Biomolecular transcoding

One of the Polish artists who has taken up issues connected with an algorithmically steered reality in his projects, performances and actions is Robert B. Lisek (a logician and artist). In the *SPEKTRUM* project, delivered for the Leto Gallery in Warsaw in 2008, he took up the issue of bioterrorism.¹⁶ The project took on the form of a bioterrorist attack in in Warsaw scenario. The purpose of the project was to show the relationship between biomolecular technology, transcoding, replication, self-replication and the possibilities of code transmission in the network. At the Molecular Biology Laboratory of Wrocław University, Lisek, using a polymerase chain reaction, grew a new, unnamed strain of *E. Cola* bacteria which could very quickly spread in water. Based on the city plan, the artist developed the quickest method of infecting all of Warsaw. In his artistic vision, the bacteria was supposed to be transported, among others ways, through the water-sewage system.

The map helps to understand – the artist claims – how pathogens (in this case my *E. cola* bacteria) spread and create complex biological and communication networks. The graphical presentation proves how dangerous new bacteria strains can be and how fast they can spread in a city like Warsaw.¹⁷

The artist also developed a computer program which processed output data from the process of polymerase into sounds and light. In the next stage of the experiment, Lisek implanted bacteria into plant structures by using green fluorescence proteins and ended up with fluorescent plants-bacteria. It seems that in Lisek's project the structures of various networks get multiplied, revealing a hidden relationship among all the communication sets. With the use of this "infected communication" one can link real and virtual (potential) systems, which indicates their dangerous, analogical structure.

In a way, Lisek launched a mutation machine. The machine *phylum*, referred to by Deleuze and Guattari, is a set of self-organising processes in which groups of previously

¹⁵ Parikka, op. cit., p. XIII.

¹⁶ Detailed project documentation: <http://lisek.art.pl/gespenst.html> [accessed: 7 May 2012].

¹⁷ See <http://lisek.art.pl/gespenst.html> [accessed: 7 May 2012].

unlinked elements suddenly reach a breaking point, after which they start to “cooperate” with one another, connect and mutate into larger pieces, just as the unnamed strain of bacteria grown this way by Lisek did. The term *phylum* in the philosophers’ definition deletes the borders between the organic and non-organic, thus becoming one of the possible terms describing a dangerous moment when forms grown in laboratories and admitted within the network start connecting without control and creating bio-objects unknown previously – mutants. Within the definition of *phylum* the phenomenon of self-organisation occurs when bifurcation (separation) of elements takes place in a specific space stage, when a new attractor comes up or when an attractor system mutates internally in response to its own movements. For philosophers, the machine *phylum* represents widely defined versions of abstraction machines which drive the process of becoming. However, from the perspective of contemporary genetic research it may also be construed as the dynamics of steering algorithms within a network system with different mutation levels and data transfer. Lisek in his project clearly indicates that integration of previously separated spheres of the present increasingly drives the situation where neuronal, tele-information, somatic, lymphatic circuits and even water-sewage systems or roads become levels of the same network – connected and inter-dependant. In this context there are no actions without consequence and the basic category is convergence. The network is a potential spot for free communication, but it is also susceptible to being steered. Experiences, affects, research results – all of which describe us may be transcoded into bits of information exchanged by millions of established connections.¹⁸

In his projects, Robert B. Lisek indicates clearly that certain digital and somatic elements may be coupled. The basis regulating the reality is formed by algorithms which co-define and co-develop communication. Information transfer becomes the life manipulation unit also within mass communication, and this does not only pertain to the social and political relationship, which is subject to change, but also to the biological level, i.e. the circulation cycle of data included in our genes.

In one of his latest projects called *KAPITAŁ* (2011), Lisek designed an object comparing his own DNA code (acquired from saliva) with the codes of selected viruses (Lloviu, Polio, Marburg, Ebola, HIV). The installation is composed of the following: the DNA decoding system and proprietary software which conducts transformations and synthesis of the artist’s genetic code with the viruses. Fragments of the viruses’ codes mutate with Lisek’s DNA, thus creating constantly expanding combinations. This process is also visualised – on a projection spectators may watch the modifying gene structures described with the use of letter sequences. An integral part of the project is also a three-dimensional model presenting a profile of the Museum of Contemporary Art building in Wrocław, in which the installation was presented for the first time. The model, being an architectural data record, reflects a labyrinth building construction – a Nazi multi-level bunker from the times of

¹⁸ See Agnieszka Jelewska, *Sensorium. Eseje o sztuce i technologii*, Poznań 2012, pp. 185-196.

World War II.¹⁹ The essence of the *KAPITAŁ* is the expanding data model applied by Lisek in which everything is either a unit or a function. This facilitates never-ending growth of this system and annexing still non-present viruses and bio-objects.

In this project the artist is interested in the real *phylum* mechanism, and in scientific analysis of methods with which organism codes become available and exchangeable. This area is mainly captured by large pharmaceutical corporations which patent new code formulas and make a profit out of this. The operations of the artist reflect then a situation in which developed code forms shall be made available publicly and free of charge, and in this way they will be able to destabilise and decentralise the existing system. In Lisek's vision, selected codes which in the future shall be the result of code combinations of viruses and human DNA may be synthesised; that is how new forms of non-human life will be created. In this context the artist's actions represent an attempt to define the criteria of development of post-human objects or units through testing the qualifiers and boundaries of humanity. The forms of post-human code that he has tried to generate represent the realisation of his theoretical research on the *singularity* idea, which is the effect of peculiarity, the moment in which – as Raymond Kurzweil claims, among other things – technology development shall make it possible to extend forms of existence endlessly²⁰. Lisek, however, perceives in the concept of *singularity* a danger to the human species. He claims that communication-like network acceleration of data exchange shall lead to yet unknown forms of synergy between science and technology, which will lead to very quick development of self-generating super-intelligent systems which might pose a danger to humans in the future. His *KAPITAŁ* project, then, explores issues connected with progress in research on artificial intelligence, nanotechnology and bio-engineering.

Case#2: Fake art

Michał Brzeziński is the second Polish theoretician-artist who often addresses the transformation issue. In his cycle titled *Fake Art* (2011) he used strategies of scientific knowledge and forms of presenting laboratory test results.²¹ However, the real nature of these works has not fully become clear. Often we have faced here mystification and simultaneous creation of contemporary scientific myth of knowledge. Brzeziński situates contemporary artistic operations close to scientific research, and asks questions about the responsibility and ethics of some biotechnology and genetic engineering projects. He rais-

¹⁹ A detailed description along with an abstract of the scientific research used is available at: <http://lisek.art.pl/CAPITAL.html> [accessed: 17 August 2012].

²⁰ Raymond Kurzweil, *The Singularity is Near: When Humans Transcend Biology*, London–New York 2006.

²¹ Detailed documentation of the project is at: <http://www.brzezinski.zdnet.pl/michal-brzezinski/artist/artistic-events/fake-art-2> [accessed: 12 October 2012]. Brzeziński previously also dealt with ontology of the video image; as an artist-theoretician he is the author of, for example, the term *video-identity*.

es the issues of identity problems of the contemporary body arising from the technical possibilities of cell and genotype reproduction as well as of the new relationship between species at the level of cell similarity created thanks to scientific discoveries. By creating suggestive contexts for his exhibitions, which as an exposition often take the form of laboratory presentations presenting, for example, various measuring devices, he suggests the scientific legitimacy of his work. In this context what belongs to science becomes in the wide perception real and consequent – it raises the social credit of confidence. The art of Brzeziński, although “fake,” tries to exist within the scientific debate and to actively analyse its impact on reality. At the conceptual level, Brzeziński enters important levels of contemporary world understanding, the domain of particles, microbes and viruses, which is often a symbolic field of cultural exclusion – a form of currently perceived abjection of the world of technologised culture which wants to retain stability, balanced growth and sterility in the first place. In such a reality viruses become an external element, excluded from the body, strange organisms carrying a mutation threat – destabilisation of the organism’s structure.

The work titled *BIOS and ZOE (Netfootage Performing Flower)* from 2011 is an object addressing the scientific theory of plant and computer symbiosis. Garden Gardenia linked to a USB slot with the use of a galvanic sensor acquires the opportunity to present, with the use of available algorithms, its affective feelings. The work, obviously another artistic “fake” in the context of the latest research undertaken, among others, by the Polish scientist Stanisław Karpiński on intelligence, communication systems and plant computation,²² becomes much more serious. The artist himself indicates the social context of his activities:

Giorgio Agamben writes about Zoe excluded from culture understood as bare life, which can be killed without the risk of moral condemnation. Agamben refers obviously to Shoah, as the context of excluding life outside BIOS, which is legally and mentally protected eligible form of life, to ZOE. Calling Jews „vermin” is exactly a reflection of that mechanism. What will happen, however, if we decide to test the vermin awareness domain, what if it turns out that understanding their emotions we will try to sympathise with them? What if we understand the sacrifice made by some forms of life to others in food production process? How can we do that? Technology seems to be only one step away from decoding living organism reactions through analysis of their electromagnetic field.²³

²² The research team headed by Prof. Stanisław Karpiński (Laboratory of Physiomics and Crop Design at SGGW University) has undertaken a scientific project whose purpose is “to understand fully the cellular and molecular mechanisms of plants which process quantum information generated within the 1st and the 2nd photosystem into electro-physiological signals, redox and hormone signals” <http://lfmbr.sggw.pl/?q=node/1> [accessed: 15 August 2012]. The project assumes testing complex plant communication and computation networks as well as their possibilities to respond actively to stress-generating factors.

²³ Michał Brzeziński, “zoe, bios... it = trans-species interface,” [online], available from: <http://www.brzezinski.zdnet.pl/michal-brzezinski/education-practice/discussions-and-criticism/it-interfejs-transgatunkowy> [accessed: 6 June 2012].

Brzeziński, referring to the Agamben text *The Open. Man and Animal*, indicates similar issues that the philosopher analysed, i.e. the necessity to give up anthropocentric forms of communication. Agamben suggested that animalism is performative, just as humanity, and the force of this situation is based on an undefined and often unmarked process of transfer between these conditions. Agamben did not want to develop hybrids, but he did want to search for an anti-hybrid space, still not achieved, non-designed, where “bare life” could articulate itself anew.²⁴ In searching for places for the needs of new articulation of what is human and vegetation connected, but also viral or bacterial, the projects of the *Fake* cycle find their space. A rather radical way of crossing these borders is represented by the Salami project, *Flesh Out of My Flesh*,²⁵ of 2011. By recalling a scientific article from *Tissue Engineering* describing the technology of producing organic tissues in laboratory extracorporeal conditions, Brzeziński announces, in line with this procedure, the start of tissue production extracted from his own body. Muscle tissue grown this way should serve to produce salami. Is this auto-cannibalism or just another way of using the cell multiplication mechanism? *Flesh Out of My Flesh* strongly opposes separating and protecting human corporality from what is animal in culture, thus perversely postulating that human cells should be treated as material for food production, just as in the case of animal or plant cells.

Exploring these issues – critical both with respect to mass culture and science – Brzeziński speaks about microchips connecting different levels of life in one chain. Exaggerating, or maybe even returning excluded and underexposed areas of contemporary experience, he indicates the possibilities of modelling affective communication. On his Internet site the artist described the concept of a musical “instrument” based on a feedback loop between a singer and the motion of bacteria watched under the microscope.

Bacteria motion shall be transformed into sound – Brzeziński describes the operation system – and an additionally applied singing layer shall be added to that sound and transformed into electromagnetic field, which shall then influence bacteria. Therefore, bacteria with their motion shall stimulate change, volume and the intensity of electric voltage generated by electrodes. An obvious effect shall also be electrolysis as a result of sound impact, caused by voltage intensity. Electrolysis leads to changes in water ionisation, oxygen and hydrogen release from water as well as drying the vessel containing bacteria. Water drying is then a process of depletion of life resources, and shrinkage of resources is correlated with life intensity, while this intensity is stimulated by one’s own activity. This activity is obviously backed up with human words. So, this work transforms human words, singing, melody into energy utilising bacteria resources. At the same time, for humans, stimulation is represented by bacteria motion, which creates sound with the help of a computer, and human resources are expressed by time, which has been envisaged for this artistic experiment.²⁶

²⁴ Giorgio Agamben, *The Open: Man and Animal*, transl. by K. Attell, California 2003.

²⁵ Detailed project documentation at: <http://www.brzezinski.zdnet.pl/michal-brzezinski/inspirations/salami-flesh-out-of-my-flesh> [accessed: 15 October 2012].

²⁶ Michał Brzeziński, “Affect: Trans-species communication, i.e. bio-art from the perspective of egzoethics,” [online], available from: <http://www.brzezinski.zdnet.pl/michal-brzezinski/education-practice/discussions-and-criticism/komunikacja-transgatunkowa-czyli-biosztuka-z-perspektywy-egzoetyki> [accessed: 6 June 2012].

Brzeziński is interested in forms of non-verbal communication, both rational and emotional, i.e. by descending to the level of affect he wants to discover new possibilities of transgressive interspecific relationship structures. Jussi Parikka, in a book also referred to by Brzeziński entitled *Insect Art: An Archaeology of Animals and Technology*, states that insects and viruses, being able to make affective communication, perceive amazing sensations and unpredictable possibilities and behaviours existing outside model frames which are traditionally used to describe them. Today they have become a model for media forms of communication. Insects are media (as forms of communication) and media are insects, just like animals which are in a constant relationship with the environment,

... the media environment, which we live in, is designed from our ethological bodies staying in interaction with technological, political and economic bodies. Or, to put it differently: we do not actually *have* media, but we *are* media.²⁷

When analysing the work of Brzeziński in the context of the latest technologies and scientific discoveries it is difficult to “grasp” the clear borderline between fiction and truth. Actually, one might say that it becomes an extended element of the performative network of associations, data, facts, theories and concepts. Brzeziński is continuously testing the interactions and self-generating possibilities of these systems.

Case#3: De/Stabilisations of the network

On the one hand, networking may raise concerns – as a digitally remedied category of Freudian weirdness – and on the other hand it seems that it may lead to a new type of global ecology, i.e. biologic-information technology of global responsibility awarding potentially all users with the possibility to move freely along the network. Awareness of networking and knowledge of management mechanisms, which are not identical to our language and narrative methods, facilitates establishing consistent connections apart from the predefined global systems focused on steering. In this reality there is nothing which clearly defines the operation of the whole system, and its final shape depends solely on the ecology of network usage.

An artist who is very strongly involved in exploring network connections is Paweł Janicki. In his project entitled *EU TRACER* (2011)²⁸ he used techniques of analysing and scanning data coming from a network which then generated musical structures and these were placed in graphic form in a three-dimensional projection space. The project was accompanied by a musician who improvised Janicki’s actions. The performance took place in various European cities (Brussels, Paris, Mińsk, Wrocław, Lviv). When performing this action in Brussels, Janicki scanned data coming from the servers of the European Parliament and

²⁷ Parikka, op. cit., p. XXVII.

²⁸ Detailed project documentation at: <http://paweljanicki.jp/eutracer/> [accessed: 27 July 2012].

various European institutions, thus making elements of confidential information publicly available this way. At the same time, during the performance in Belarus, Internet traffic was constantly routing the artist to a site with the words “Lukashenko the last dictator,” and this slogan was displayed on the screen among other pieces of information filtered from the network. In another project, *Ping Melody* (performed since 2003), within life operations Janicki also explored communication and the interactive possibilities of a network.²⁹ He invited musicians to participate in the project – the sounds of their instruments or their voices were first changed into data packages, which were then sent into the network, and then came back distorted by delays and errors which had occurred during the transmission. The visual sphere of the performance was created by information on transmission and the occurring errors, which was made available by the artist. In *Ping Melody*, part of the used software code was copied by him from software developed by DARPA scientists. Janicki revitalised a military system developed by an American agency and by adjusting it to the needs of artistic operations, he made it a part of a system constituting a modern musical instrument. As he wrote himself:

I am interested in a certain unique feature of the global communication environment, being a key element for decision making structures (governments, administration, management, etc.). Namely: it is characteristic for many technocratic cultures to switch from a decision making system directed against individuals or groups, disrupting community *status quo*, to a system, which is collective, legal, automatic or algorithmic. Factors responsible for exercising control in a new system may be placed by supervising institutions within groups. Therefore, repression acts directed formally against destabilising factors may actually be forms of defensive strategies sourced from decision making structures [...] Algorithmic, automatic procedures maintain neutral status, their usage is a sort of auto-camouflage hiding real, particularly sophisticated motives of the occurring processes.³⁰

Janicki, through creative and individual development of programming tools, constructs open data transfer systems which are critical regarding the top-down forms of network steering, and he indicates possible places where overvoltage and errors take place in the transcoding system itself, which may become the beginning of a new communication system.

Networks – Castells says – are structures [...] which are able to distribute without limits [...] Network-based social structure is a highly dynamic, open system [...] However, network morphology is also a source of radical reorganisation of relationship of power. Network connecting relays (e.g. financial flows, taking control over media empires, which influence political processes), are privileged power instruments. So those who control relays are power owners.³¹

²⁹ Detailed project documentation at: http://paweljanicki.jp/pingmelody_main_en.html [accessed: 27 July 2012].

³⁰ Paweł Janicki, “Ping Melody: ideological undercurrent,” [online], available at: http://paweljanicki.jp/pingmelody_ideologicalundercurrent_en.html [accessed: 27 July 2012].

³¹ Manuel Castells, *Spółczesność sieci*, transl. by K. Pawluś, M. Marody, J. Stawiński, S. Szymański, Warszawa 2011, p. 492.

By applying the strategy of disclosure of data and the structures which organise them, Janicki brings attention to the convergence of what is social and what is technological, thus indicating that this process is the “basic source in shaping, leading and deceiving societies.”³²

One of the techniques used by the artist is *live coding*. This is a strategy which consists in creating software code live. During a public show the performer most often creates a code generating sound and visual structures. In this case the code defines the entirety of this situation. There is not only the structure and ontology of the work, but also contact and relationship with the audience. In other words, the interactivity of such an event is coded at many levels, it shapes the form of the message but also the types of perception; it exceeds structural meanings and directly determines the nature of the situation. It becomes an element of collective identity, often not only through a meta-model emphasising the network nature of contemporary subjectivity but also mainly through active tracking of information posted on the Internet which is not accessible to its normal users.

Janicki is also a creator of interactive interfaces and a designer of a new type of experiences in the domain of *human-computer-interaction*, thus developing experiences of media which represent the dynamic structures of a techno-somatic relationship. His search in the interactive media environment has become the reason for developing such works as, among others: *Mapping Chopin* (2010),³³ during which spectators could influence the pace and dynamics of the Chopin music being played with their moves, or *Oceanus* (2011),³⁴ which was an attempt to create an interactive non-linear narration (the work had the form of an interactive table facilitating free operation of the virtual objects that were placed on it).

The strategies and areas chosen and explored by Janicki, e.g. visualisation of information, *live coding*, designing interaction and new types of media experiences, seem to be of key importance to contemporary art. By crossing schemed forms of communication they become the beginning of a chain of changes changing the way of thinking about the intermediary role of media. In Janicki's projects, critical levels such as extracting hidden data from a network are very often complementary to new types of manipulation and exploration of media narration. By also addressing the social-creating function of software, as referred to by Manovich, Janicki examines network possibilities as endless deconstructions and culture constructions.

Siegfried Zielinski, in his book entitled *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*, indicates that technology is not human, it is rather deeply non-human. The best technological achievements have been completed in opposition to what was commonly defined as human in a given moment in history.³⁵ In such a context, media do not only represent the extension of humans but rather humans

³² Ibid., p. 493.

³³ Detailed project documentation at: http://paweljanicki.jp/mappingchopin_en.html [accessed: 27 July 2012].

³⁴ Detailed project documentation at: http://paweljanicki.jp/oceanus_en.html [accessed: 27 July 2012]

³⁵ See Siegfried Zielinski, *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*, transl. by G. Custance, Cambridge–London 2006.

become a part of multi-level processes, they sometimes launch some of them, which, further on, within self-replication activities, may develop separate structures and even unknown forms of life. Lisek creates an algorithmic mutation machine which may potentially destroy him; in the case of Brzeziński, experiments in computing a human-virus, human-plant become ethically ambiguous and cause social unrest; overvoltage and copying network fragments, as performed by Janicki, may cause breaks in data transfer, may transform them entirely and destroy many connections. Deleuze and Guattari knew very well that technology delivering mutations and translation tools sets the end of thinking about the body and organism as closed, limited models. Therefore, one needs to look at how our networked organisms continue to articulate themselves along with all that has been traditionally perceived as external to what is human.

We know nothing about a body – they claimed – until we know what it can do, in other words, what its affects are, how they can or cannot enter into composition with other affects, with the affects of another body, either to destroy that body or to be destroyed by it, either to exchange actions and passions with it or to join with it in composing a more powerful body.³⁶

Destabilising processes uncover to certain extent a performative and often unstable life structure at its most basic level. Schrödinger wrote about creating life from aperiodic crystals, unstable mutation forms, so it seems that contemporary art, in researching new forms of relations and their connecting procedures, transposes them into the domain of social experience, makes them more distinctive, possible to experience, direct and distinct from laboratory restrictions, and unveiling their programmable mechanisms.

“It from bit,” the famous sentence by John Archibald Wheeler – the last working colleague of Einstein and Bohr – who claimed in his publication titled *At Home in the Universe* after several years of conducting research on cellular communication that a bit became an elementary particle: not only microscopic but also abstract – a binary digit, a trigger, zero-one. According to him, information brings everything to life – each particle, every force field, even time-space infinity. However, the consequences of this fact may be very different. This is where the whole domain opens up for artistic actions exploring the various consequences of contemporary bio-engineering and programming as well as for contemporary humanists, media theoreticians, sociologists, and culture experts exploring and contemplating the mutation machines which are launched in laboratories but are linked to social, political, ethical and other circuits through communication networks. The increasingly clear and more affecting instability of these circuits, as well as the self-replication processes of various new bio-objects emerging within, are becoming an important and urgent challenge to the human species. Therefore, there is a constant need to return and redefine these complex contemporary phenomena of transmutation and networking also through strategies used by the arts.

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³⁶ Gilles Deleuze, Félix Guattari, *A Thousand Plateaus, Capitalism and Schizophrenia*, transl. by B. Massumi, Minneapolis 1987, p. 284.



Bios and Zoe, Michał Brzeziński, 2011



Biomimesis: Hyphae, Szymon Kaliski, 2013

How does the brain work? Comments on mathematics and arts

The main issue I take up is trying to understand how the human brain works. I also deal with evolving biological systems such as viruses and simple organisms with nervous systems. I am interested in the mutual relationship between mathematics and arts. Some of my projects relate to collective intelligence, which is a space in which values are not developed by one entity but by a large number of players, e.g. the stock exchange. I develop methods for analysing and processing large sets of information. In projects, I use various techniques of machine learning. In this class, there are also projects testing problems of security, terrorism and the development of social conflicts. I ask questions about operation, control and power in societies, in which a dominant role is played by flows of data and people.

In my operations, I connect post-formalist practice with a critical approach to the subject. In the 1980s, I created pictures and performances with the use of abstract figures and symbols. These works may be interpreted as considerations over space and image in general as well as dependencies, which occur between the work of the brain and body motion in physical and social space. Gradually, mathematical constructs, which fascinated me almost obsessively, have been rooting more and more in the real world. My departure from object art to post-conceptual art has been accelerated by the development of the Internet and biotechnology. On the one hand, my art researches physiological, biological and cognitive processes occurring in the brain and living organisms, and on the other hand, it tests these processes critically in the context of prevailing social-political discussions. Ever since, I have been absorbed by a randomness problem. Initially, I focused on the entropy issue using information theory (Claude E. Shannon and Alfréd Rényi). Shannon changed the perspective concerning the issue of how we communicate, posing an interesting question. Let us assume that information is sent through a certain channel (which may distort some symbols). What is the maximum pace of transmission, which still allows the recipient to reproduce a sent message without errors? Then, "I entered the brain" and I started to deal with the domain referred to as artificial intelligence, and in particular machine learning. In a longer perspective, I am not interested in simulating the behaviour of the human brain but in developing a programme which would address very difficult issues much better and faster than people.

Entering the brain

In my opinion, one of the key problems of contemporary science and art is understanding how the human brain works. One needs to deal with the brain using information theory; learn how the feeling works, as well as learning and thinking. It is also worth working on brain biology or neurology, which means learning about brain anatomy. Some comprehensive understanding of how the brain operates may emerge within the next thirty years.¹

Perhaps this problem consists in analysing a huge number of details at different scales of the brain's work. One needs to understand that mathematics transforming into information technology becomes empirical science. Just like in physics, experiments finally lead to theory. Experiments in mathematics may be purely intellectual and that is what it has been like for ages, but now, we have learned how to make experiments using computers. Computers offer a new field for experimenting. This is a new dimension in experimenting. There are certain experiments which cannot be performed in the mind, but experiments can be made with the use of a computer. An example of mathematical problems which have been solved using computers are classification problems regarding all simple finite groups and the four colour theorem. The arts have always been connected with certain actions and experiments, which simultaneously have an intellectual and empirical nature. Examples shall be quoted further on in this work.

Perhaps the brain problem is so complex that no simple and clear brain theory can be formed, e.g. perhaps brain memory does not have a global structure. Perhaps it does not contain anything apart from a million various separately stored elements and then no memory theory can be formed but one can only emulate such a structure with the use of a computer programme.²

It is assumed that mathematics is a product of thought independent from experiment, which however matches the real world very well. At present, however, mathematics changes and transforms into science based more on experiments. Some mathematical experiments are made on computers. The discoveries of Ernst Gödel have fundamental philosophic importance for the basics of mathematics. Gödel proved that there are theorems which are sensible, but one cannot prove whether they are true or false, with a given set of axioms. He used a simple idea, based on an unambiguous assignment of integers to the terms of arithmetic language. Thanks to that, instead of formulas and theorems, one can speak of numbers and the relationship between them. The result of Gödel was destroyed by Hilbert's programme, which indicated the limitations of the axiom based method. The axiom method is the death of the great idea, which means that as soon as a problem becomes so well organised that it can be reduced to an algorithm, nothing more is left to be done. Gödel proved that axiom based reduction is impossible within a mathematical system, including elementary arithmetic. He showed that always, regardless of how big the

¹ See John A. Hertz, *Introduction to the Theory of Neural Computation*, Santa Fe 1991.

² See Dana H. Ballard, *An Introduction to Natural Computation*, Cambridge 2000.

set of axioms can be, there will exist theorems, the truth or falsity of which would not be provable. This means that there is always a possibility of modifying this system and mathematical thinking reaches much farther than axiom or algorithm theories.

“Life” problem

Another important contemporary problem is understanding how “life” works, how elementary evolution processes occur, which form the basis of life. Therefore, it is important to refer to the biological sciences. Biological theory does not have to resemble mathematical and physical theories. Information technology is a better tool for making theoretical considerations in biology than writing analytical equations. A domain referred to as bio-information technology is developing. As one cannot understand nature without evolution, we created programmes that evolve. Chaitin showed how one can “empirically” deal with mathematics, which addresses the issue of what “life” is.

I have always been interested in problems more than theories. Creating in mathematics means solving riddles and not subjecting theory to axioms. Good problems generate the creation of interesting objects. In respect of some problems, there is some sort of a mysterious factor, which makes them important for the future, e.g. the solution to a simple riddle assuming that it is impossible to divide a cube into two cubes, the power four into two powers of four, etc., known as the great theorem of Fermat, was attempted by a few generations of mathematicians for over 300 years. Wiles proved it to be true only in 1994. Attempts to solve it, helped to develop a significant part of contemporary algebra, connected with such issues as the theorem of elliptic curves and other areas of mathematics.

However, in my opinion, the introduction of probabilistic methods by Paul Erdős into the theorem of numbers accounts for the most important event, which formed the basis of all modern mathematics and information technology.

Geometry

A field which has always been perceived as a meeting point of science and art is geometry. This is one of the oldest and best-known domains of human knowledge and a great achievement of the ancient Greeks, used by them for the needs of temple construction or sculpturing. Geometry was subjected to axioms by a group of mathematicians connected with Euclid (in a sense that from a small number of obvious theorems one can extract a whole universe of facts). Then, it turned out that there were gaps in this scheme, i.e. suddenly some terms emerged, which were not subjected to axioms. The final axiom alignment of geometry took place as late as in 1895, which was some 2000 years after Euclid. The gaps led to the generation of new non-Euclidean geometries, which have been applied in contemporary physics. Modern geometry is about checking what role is played

by dimensionality, which is why some things happen with three or more dimensions and other do not. It seems that it is geometry which is the key to the world of nature. Why only certain things observed in nature can occur in space with specific dimensions? Another stage of geometry development is the creation of topology and the application of algebra methods, in particular algebra discoveries by Liego and Clifford, which form a perfect basis for quantum physics and modern methods for developing and modulating space with the use of computers.

Mind, language and arts

The work of the human brain and thinking is often connected with language and for some, it is unthinkable without language. The philosophical assumptions relating to my work are based on the term of a "number" and they place my approach far from views such as behaviourism, pragmatism, mechanism, naïve realism or Marxism. First of all, a language behavioural theory and Marxism perceive language dogmatically as part of reality and never the other way around – reality as a language product. Both behaviourism and Marxism refrain from language analysis. Second, one should not connect my works with the assumptions of cybernetics and information theory. Both are based on similar assumptions to behaviourism.

According to my approach, the mind is a part of extensional number theory. This is the approach of Pythagoras, Plotinus, Euler and Ramanujan, by which numbers only represent themselves. In contrast to that, an intentional number theory encompassing the theory of recursion, information technology, etc. claims that numbers can represent other beings or act as their approximation. Usage of the term "number" can be very differentiated. The first method is connected with the development of a term continuously generalised for the needs of mathematics: integers, rational numbers, algebraic numbers, transcendental numbers, infinitely small numbers and transfinite numbers, surreal numbers, complex numbers, etc. The second understanding relates to the theory of numbers and enumerative combinatorics: sets or sequences of numbers, prime numbers, Mersenne numbers, Fermat numbers, etc. The third area is the whole universe of unique numbers: pi, Napier's "e" number, Euler's gamma number, constant Feigenbaum's number, algebraic numbers and very large numbers, like Ackermann's numbers. At one stage, I started to deal with mathematical objects which exceeded geometrical objects, numbers and functions analysed so far. I focused on algebra and in particular on lattices and partially ordered sets. In my latest research on mind uploading, I have been using Clifford's algebra. The problem of mind-matter is much more complex than materialists and behaviourists could imagine.

Awareness constitutes language, i.e. it produces language and simultaneously it is being produced by it. Description of an object by labelling is inadequate in terms of such an object's perception. However, awareness is of interest to researchers only as a transforming function. The conventional approach perceives the mind as a sort of a computing machine, such as

a computer. However, there is broad literature showing the limits of such an approach (Roger Penrose, *Shadows of the Mind: A Search for the Missing Science of Consciousness*, 1994; Robert Rosen, *Life Itself. A Comprehensive Inquiry into the Nature, Origin and Fabrication of Life*, 1991; George Kampis, *Autogenesis: the evolution of replicative systems*, 1991). Penrose uses extensions of the problem connected with stopping the machine in order to show that the mind cannot be a set of algorithmic processes. Rosen claims that calculability is not the right representation of natural phenomena. Kampis indicates that the information content of algorithmic processes is limited. Similar arguments show that the brain exceeds the setting offered by information technology's version of behaviourism.³

Language as power. Language presents itself as a norm, particularly in law and the economy. Our civilisation suppresses every type of transcendence: it is a protective wall against the attacks of irrational conditions; language comes through us creating identity and because of that, it limits various possible experiences. But if there is anything which prevents us from accepting language as the main organising principle, it exposes us simultaneously to a double danger: getting lost in the landscape of consciousness or losing group support in the life-death game. We risk losing the feeling of security, provided by the fact of living in herds. Around language, a galaxy of various technical means of confirmation is grouped, among which the most important is education, which is a correction of every variation from group and species rules. Of course, treating "words as tools" according to Wittgenstein, may only be important in shaping (regulating) human behaviour, and language provides the frame for education. Therefore, all artistic and creative activities negotiating with new types of experience approach language with suspicion, and education in particular as type of knowledge police. Language is generally characterised as social awareness and even as the memory of mankind. Revolution against language is a rebellion against society. Cultural sabotage and terror are elements of artistic practice.

Of course, the fact that in democracy a state is based on language makes it consequently similar to a totalitarian state. That is how "conscious society" is developed. Consciousness managers are always wanted. News is always conditioned by the rulers, information in itself is a behaviour-shaping instrument, and steering impulses are distributed with the help of language. The basis for information theory is to ensure that instructions are communicated with the help of psycho-educational purposes of official communication. Therefore, information theory has purely behaviourist assumptions. The Internet and communication networks help to keep the previously established status quo. Levelling interests and apparently even information distribution by network application is a bankruptcy of individuality. Information theory, as regards language as a method of instruction usage is the culmination of pragmatism. Facts and data attracting user attention make users perceive illusion as reality. The development of a communication system and regulations with the use of certain network protocols may be perceived as an attempt at indoc-

³ See Robert B. Lisek, *Retracts and Fixed Points in Theory of Ordered Sets. Towards Combinatorial Computer Science*, Proceedings of the Seventh International Conference on Complex Systems, Boston 2006.

trination and social unification. The dark side of mathematical applications, such as information technology, shows up as a process of transforming language into information, which in practice means the reinforcement of power: all that can be programmed is potentially easy to control (it facilitates noticing things by labelling and describing). In this context, mathematics may be perceived as the basis for easy manipulation of the reality and a tool for exercising its control.

Intelligence and evolution

More and more people are consciously or unconsciously involved in Internet development. As a result of that, a huge set of data has been established, which provides us with millions of potential observations as regards humans in general. All those network actions can be monitored and then processed and interpreted. Collective intelligence is intelligence which is the result of thoughts and behaviours of a large number of people. A trivial example is the behaviour of the financial markets, where share prices are not established by one person, but by the behaviour of many independent entities. Other examples include Wikipedia and the Google search engine, which uses the PageRank algorithm, i.e. just like many other sites, it links to a given site. Though methods of collective intelligence existed before the Internet, the possibility to collect information from thousands or even millions of people in the network created many new possibilities.

In my projects, such as *NEST* and *CRASH*, I have been using a data source in the form of open API or open data bases as well as different machine learning algorithms as intelligence methods. First, I collect information from many sources, created by various groups of people. It is easy to write simple programmes in Python, which may acquire and process data. Then, I group data, I filter and analyse them. Machine learning is a sub-domain of artificial intelligence (AI), which deals with algorithms allowing a programme to solve a problem through optimisation or learning. The programme receives a set of training examples and then it is used to solve more general problems and forecast. This is possible, as almost all data include some repeatable patterns which may be generalised by the programme. There are many different machine learning algorithms, each of them with different powers and applied to different types of problems. Some of them, such as decision-making trees, are transparent, which means that an observer may understand wholly the reasoning process and decisions taken by the machine. Other ones, such as neuron networks and genetic programming are black boxes, which means that they produce a correct answer but it is impossible to reproduce the reasoning behind problem solving. There are, obviously, induction limitations of such an approach. Machine learning methods facilitate generalising on the basis of collected data, but big generalisations based on a finite number of examples may not be entirely correct. Machine learning is an active research area, which is also applied in biotechnology. The progress of sequencing technology delivered huge sets of data such as: DNA sequences, protein structures, etc. Machine learning tech-

niques are widely applied in respect to all types of data, with a view of finding patterns that will facilitate better understanding of biological processes. They are also applied for interpreting images, e.g. vehicle identification or face recognition. They are also useful for stock market analyses. Ever since the stock exchange was established, people have tried to use mathematics to forecast stock exchange patterns and earn more money. And since there are more and more users and their behaviour is getting more and more sophisticated, it has become necessary to develop methods for the analysis of large sets of data.

NEST – Citizens Intelligence Agency – is the project that works on the issue of processing large sets of data from many sources. I have developed a search engine and tools for data analysis, and then for representing and visualising data in the form of graphs and multi-dimensional spaces. *NEST* is a portal and a set of tools for exploring connections between people, groups, documents, locations. It is also a sort of a Citizens Intelligence Agency, providing people with tools and technologies similar to those used by their government. The project also researches security and privacy issues in network societies.⁴

While developing the project *CRASH*, I first created a crawling machine which finds millions of sites on accidents and crashes. Crawler, which is an Internet robot, collects information from sites and checks links helping to find other sites. The robot should be tolerant of damages in site code, which is helpful as one can never know what sites can be found by the robot. The real magic, however, is how search results are sorted and processed. After collecting, data is indexed and stored in a created MySQL data base. The next step is to discover groups and connections between objects, i.e. the analysis of connections between words, documents, things and persons⁵. For this purpose I use, among other techniques, clustering, which is an analysis of concentrations of given matters connected in terms of subject as well as a measure of distance between objects. What counts is the word frequency, i.e. how many times a given word is repeated on a site, and word distance, i.e. how many times such words occur together. A precursor of this project was *FLOAT*, which I created while working for New York and Lower Manhattan Culture Council. I also used clustering in the bio-information technology project *KAPITAŁ*, where a programme was dividing genes of new organisms into certain classes. I also use other techniques of machine learning, both supervised and unsupervised. Supervised learning is about techniques using known and correct examples of solutions for programme training, e.g.: neuron networks, decision-making trees or support vector machines (SVM). In case of more complex problems, unsupervised methods are used, such as Reinforcement Learning or genetic programming. The programme learns without delivered examples, using only a constant inflow of data from the surroundings. After performing an activity, the programme receives a real number reinforcement values, which form the assessment measure of its operation quality. An example of a simple robot in Python:

⁴ See Robert B. Lisek, *NEST* – ARCO Madryt, <http://fundamental.art.pl/NESTofficial.html>.

⁵ See Robert B. Lisek, *CRASH* – FILE Sao Paulo and CSW Zamek Ujazdowski, <http://fundamental.art.pl/NESTofficial.html>.

```

import urllib2
from BeautifulSoup import *
from urlparse import urljoin
# Create a list of words to ignore ignorewords=set(['the','of','to','and','a','in','is','it']) def
crawl(self,pages,depth=2):
for i in range(depth):
newpages=set() for page in pages: try:
c=urllib2.urlopen(page)
except:
print „Could not open %s” % page continue soup=BeautifulSoup(c.read())
self.addtoindex(page,soup) links=soup('a')
for link in links:
if ('href' in dict(link.attrs)): url=urljoin(page,link['href']) if url.find("#")!=-1: continue
url=url.split("#")[0] # remove location portion if url[0:4]='http' and not
self.isindexed(url): newpages.add(url) linkText=self.gettextonly(link)
self.addlinkref(page,url,linkText) self.dbcommit()
pages=newpages

```

CRASH was presented as an installation consisting of a network robot searching for information in real time and data bases, which collected millions of records connected with various types of accidents and catastrophes, together with tools for analysing and graph presentation of connections between them. Common-sense hypotheses relating to a specific air accident are verified, compromised and rejected. *CRASH 2.0* is a collective self-portrait in a participatory process of immersion and self-reflection. The project also offers the spectators an opportunity to understand that art is not about the creation of autonomous inspiring aesthetics, which exist somewhere beyond the world, but it is part of social exchange subjected to the rules of market exchange. It needs to be emphasised that a project analyses the connection of prevailing ideologies and doctrines with history. Ideology changes and becomes a myth. A myth grows from ideology and helps to mitigate formal and fundamental social conflicts.

Usually we deal with problems which have many possible solutions for many variables. The results may differ significantly depending on the combination of such variables. The optimisation algorithm finds the best problem solution testing many different options. Optimisation methods have a broad range of applications, e.g. in physics for studying molecular dynamics, in biology for guessing protein structures. They may also be successfully used in art and music. Genetic algorithms are used for optimisation techniques imitating natural evolution. First, a set of random populations is established. At each stage of optimisation, a function of costs for the entire population is calculated with a view to acquiring a ranking list of solutions. Methods of data classification include, among others, Bayes classifiers, decision-making trees, or support vector machines used for modelling and

forecasting. An important element of the forecasting process is establishing which variables are of importance and which do not influence the result significantly. Support vector machines are used for solving problems, which relate to very complex multidimensional sets of data, e.g.: recognising facial expressions, forecasting protein structure based on their sequences, recognising handwriting or defining potential damages during an earthquake.

Evolving intelligence. In some projects, I used a specific algorithm which could help in solving a given problem. In other projects, such as *FLOAT* and *ENGINE*, I had to adjust the parameters or use optimisation to find an adequate set of parameters. However, a problem can be approached differently, by writing a programme which automatically tries to develop a better programme. It is important to use a new type of algorithm, which develops new algorithms independently. To do that, the machine learning technique should be used, referred to as genetic programming. I am starting with a large set of programmes, which are randomly generated. Then, these programmes compete to solve a predefined task. Finally, the best programmes are selected and modified by mutation and crossing. This replication and modification procedure creates many new programmes. At each stage, the quality of programmes is calculated with the use of the adjustment function. The process is repeated many times until an ideal solution is found or at least a solution good enough to solve the problem.

Another example is my project *FSB – FFFUCKING STOCK BABE*. Financial markets are considered to be an example of collective intelligence, since they feature a large number of participants acting independently based on different information and motivation. In the work *FSB*, I wrote simple codes in Python, to collect and manipulate stock data and analyse dependencies between corporations such as Google and Facebook and the world of art. The project uses the value of Google shares and the number of shares bought and sold in one day. The project plays with stock exchange data connecting prices of Google shares and the company's image strategies, as the sponsor of arts and various museums. In the *FSB* project, a simple neuron network is used to change the data ranking. The main advantage of neuron networks is that they can work with complex non-linear functions. Their main disadvantage is that they are a sort of black box: the network may have thousands of hubs and synapses, so understanding how it solved the problem becomes impossible. I also developed special hardware in form of Data-glove and VR-helmet, thanks to which an *FSB* installation participant may watch a 3D stock data representation and manipulate data by making hand and head gestures.

The project exposes the mystification process of Google corporation actions as well as violence occurring at a symbolic level, and indirectly its involvement in direct violence. Apparently different elements: violence in China and sponsoring various museums by Google are connected with each other. Google cooperated with the Chinese government with a view to introducing censorship of information that can be accessed by Chinese citizens, contributing directly to subsequent detention of thousands of opposition activists and helping to retain awareness control of millions of citizens. All this is happening in the

context of permanent digital war between the United States and China: last year, there were 140 000 Chinese hacker attacks on the USA military servers. However, the problem does not only relate to China or Africa, where Google is currently investing. It was particularly visible in the United States. It is not a secret that Facebook corporation signed contracts with the national security agency NSA (using intermediaries such as In-Q-Tel and Visible Technologies companies), which provide the agency with access to most of the records maintained at Facebook servers. Presenting specific examples, the *FSB* project shows simultaneously that digital culture may be treated as a certain symbolic cover, which is the reflection of the social order and that it operates as a base of the economic reality based on domination, colonisation and bloodshed.

In the exchange system, art becomes a product.

Art objectification is obviously an old invention, but in modern societies it takes new distributable forms. It is important to differentiate between a traditional patronage perception and public relations as image manoeuvres. "From an economic point of view, such involvement in art may bring direct and measurable benefits. It may be used for developing and improving the image of a government/party/company and as such result in a good public reputation and large social support."⁶ The state and corporate patronage system is shaking and reorganising during the "crisis" and overvaluing, such as manifestations of the Outraged Movement and against Acta, as well as during the political epidemic which is represented by the Arab Spring. Huge deficits, often caused by great increases in military budgets or manipulations at financial markets led to cuts in social services and art financing at the same time. Stock exchange manipulations may use software, servicing millions of micro transactions. High frequency algorithmic trade is a trading method which consists in making a huge number of orders with high frequency, with full automation, using ultrafast algorithms generating buy or sell signals. In this context, one needs to consider approaches towards corporate image strategies and using mass media in general, as well as the possibility of understanding the behaviour of network societies in relation with such terms as authority, control and power. The exchange possibility within network societies activated anew group actions, delivering new methods for group organisation, as well as new means to facilitate undermining well-established power and control structures. To wind it up, art has the potential to develop goods exchange and also silence critical voices on liberalism and capitalism as a domination system. Art and culture, or at least their patronage, may be used for society suppression. *FSB* – a code in python facilitating the collection of stock data:

```
>>> import stockquote, os
>>> h = list(stockquote.historical_quotes("GOOG", "20101010", "20101231"))
>>> print os.linesep.join(["%25s: %s" % (k, h[0][k]) for k in sorted(h[0].keys())])Adj Close:
593.97Close:
593.97Date: 2010-12-31High: 598.42Low: 592.03Open: 596.74Volume: 1539300
```

⁶ David Rockefeller, *Memoirs*, New York 2002.

```
>>> q = stockquote.from_google("GOOG")
>>> print os.linesep.join(["%25s: %s" % (k, q[k]) for k in sorted(q.keys())])GOOGLE_CODE_ccol:
chrGOOGLE_CODE_id: 694653GOOGLE_CODE_l_cur: 701.96GOOGLE_CODE_s: 0change: -0.74exchange: NASDAQprice_close: -0.10price_last: 701.96price_last_datetime: Dec 14, 4:00PM ESTprice_last_time: 4:00PM ESTsource_url:
http://www.google.com/finance/info?q=GOOGsymbol: OOG
['\xef\xbb\xbfDate', 'Open', 'High', 'Low', 'Close', 'Volume'] ['8-Feb-13', '780.13', '786.67', '779.56', '785.37', '3024853'] ['7-Feb-13', '769.70', '778.81', '765.50', '773.95', '2840506'] ['6-Feb-13', '759.07', '772.96', '758.50', '770.17', '2079687'] ['5-Feb-13', '761.13', '771.11', '759.46', '765.74', '1870716'] ['4-Feb-13', '767.69', '770.47', '758.27', '759.02', '3041242']
...
```

Relationship demystification attempts, occurring between government institutions, galleries and artists, were already the area of my exploration in the 90's of the past century, e.g. in the *REMOVAL OF GALLERY* project. The project reveals the complicated relationship of artists with institutions and their curators. National galleries and museums present themselves publicly as autonomous aesthetic domains, as providers and caretakers of cultural artefacts, while government agencies or culture ministries present themselves as enlightened benefactors-patrons. However, this relationship is mystified in the sense that these two worlds – the worlds of culture and power, hide their relationship. It is trivial that there is certain symbiosis between them, e.g. the National Museum co-exists with the Ministry of Culture and a number of other global and national-service providing corporations such as the Army or Roman Catholic Church. The work focuses on the exchange system between a gallery and a governmental agency. The project checks strategies by which a national gallery and government agencies maintain symbiotic relationship. Similar mystification occurs at many levels of the system managing the presentation of Polish art. For example: the Polish government is involved in the war in Afghanistan and, at the same time, it is a patron of new exhibitions attended by Asian artists. The Prime Minister of the country spends Independence Day with soldiers deployed in Kosovo. The UG project, being critical about the existing practices, is a sort of crack in the system, and it tests the official space concept of a public gallery as space devoted to protection of timeless aesthetical spiritual values and indicates that it is a place devoted to business. What really happens there is the exchange of capital: financial capital from patrons and symbolic capital necessary for maintaining the status quo of power. In the project *REMOVAL OF GALLERY* I took over the BWA Awangarda gallery in Wroclaw by taking control of the server and gallery's identity using various types of network attacks and occupying the physical gallery space with a group of fellow artists. The BWA father directors responded neurotically: in fear of losing their positions, they hired a law firm and they filed charges against us at the prosecutor's office.

Biological exchange

Another part of my research concerns the problem of organism evolution and the development of intelligent systems. Some current attempts to describe the evolution of biological systems, such as the term of Turchin meta-system transition or Chaitin biomathematics have very limited application. These are attempts to describe what we already know about the past and the evolution of past forms of life on our planet. In my approach, I skip long time intervals and I focus on evolution "in a nutshell:" analysing and modelling such forms as viruses, which in a short time create millions of new mutations. Understanding this process and creating a mathematical virus model shall facilitate in the future better cognition of processes referred to as "life." Computation is an integral feature of natural and artificial systems, as almost all of them can transform information in a predictable or programmable way. Theoretical paradigms are developing, such as cellular automata, artificial chemistry, evolutionary information technology and neural networks. We are witnesses of the creation of experimental prototypes of natural computers: plasmodium computers, reaction-diffusion processors, amorphous computers, DNA computers, etc.

For many years now, I have been fascinated with the processes of fast self-replication and the distribution of organisms and codes in space. I have prepared a few projects which experiment with bacteria and viruses. In the project *SPEKTRUM*, I grew *Escherichia coli* bacteria, which duplicate very fast and distribute in water. The exhibition was prepared as a scenario of a bio-terrorist attack on the city of Warsaw. Bacteria were presented in the LETO Gallery together with a map, on which I showed the optimised operation of bacteria: its distribution at hubs such as water treatment stations and the main water-sewage hubs of Warsaw. I created new hybrid bacteria. In this method, the important thing is in the approach to genetic engineering through the development of a new agent at a molecular level. Another example is the *KAPITAŁ* project, based on a fusion of my DNA extracted from saliva and various viruses. The sabotage takes place gradually, in sequences, it acts indirectly and with delay. The most important is the way in which the pathogen (virus, bacteria – Biological Suicide Bomber) is distributed and how fast it distributes.

The tension between biology and political economy leads to the following questions: is an individual an owner of its own body? does owning constitute its property? and under which conditions? What are the methods for authorising and selling organs, cells or DNA? Under which conditions can companies or government organisations collect and manage biological material? What is the collected biological information such as information in the form of DNA sequences? Is the DNA of a given person different than the person itself? Can such information circulate in an economy totally separated from a person? In what way do bioterrorism, DNA data networks and health organisations constitute a new type of bio-politics?

Information technologies totally transformed the economy, culture and political relationships. Shannon says that information itself has nothing to do with the contents of information. Information is a certain amount of data sent from point A and reaching point B.

The reality quantization process transformed information in itself into a product. The circulation and distribution of biological information, material and non-material, becomes a dominating paradigm.

In the project *KAPITAŁ*, I linked my DNA code [extracted from saliva] with the code of certain viruses [Lloviu virus, polio virus, Marburg and Ebola virus]. A group of objects emerged, which are non-human and immortal, in the sense that they have features allowing for their limitless reproduction, transformation and distribution in space. I used the codes of a few specific viruses. However, the program is designed in a way so that the virus sequence could be extended, i.e. so that the codes of other viruses, which are introduced into my DNA, could be added to the sequence. Another problem addressed by the project is the analysis of methods by which DNA codes are made available as well as their position in capital exchange. It is known that this domain is more and more monopolised by the pharmaceutical industry, which is trying to patent new codes or make a profit on such actions. In my understanding, there are situations where life should not be put on sale. This is an attempt to create a new class of codes, different than human, and make them publicly available free of charge in the network, which causes decentralisation in the capital exchange system. An integral part of the project is a multidimensional presentation of data in architecture. The project was exhibited in a multi-level post-Nazi bunker – Muzeum Współczesne (Contemporary Museum) in Wrocław and WORM Instituut voor Avantgardistische Recreatie in Rotterdam.

The work *KAPITAŁ* also deals with problem of “life.” Its purpose is to understand evolutionary changes by way of measuring transformations of organism code. The origin of such an approach has its source in the ideas of Stanislaw Mazur, Stanislaw Ulam and John von Neumann on automated machines.⁷ In this context, one can treat a biological organism as a natural, self-reproducing automated machine. Although some old cybernetic models are based on a central, hierarchical structure, new methods emphasise self-organisation, autonomy, decentralisation and the interaction of many factors. Few models have been developed, which may be applied both in respect to organisms and social systems: James Grier Miller (1978) – life systems theory, Humberto Maturana and Francisco Varela (1980, 1992) – autopoiesis theory, William T. Powers (1973, 1989) – perception steering theory and Valentin Turchin (1977) – meta-system transformation theory. According to this approach, social systems and biological organisms may be perceived as a special case of a very general category – which is the “autopoietic system.” Autopoietic (a Greek word meaning “self-production”). The system consists of a network of processes, which recurrently generate their own components and separate themselves from the surroundings. For example: living cells may be defined as a set of chemical processes which mutate continuously and produce particles necessary for cell operation. Replication is often perceived as a function defining “life.” However, copying without autopoiesis does not mean life: some crystals may replicate but

⁷ See John von Neumann, in *Theory of self-reproducing automata*, ed. by A. W. Burks, Urbana 1966. Stanislaw Ulam, *A Collection of Mathematical Problems*, New York 1960.

we do not claim they are alive.⁸ The purpose of the project was to consider and expand the term of "life" by way of analysing self-production and self-organisation processes. In the social context, understanding the process of capital recombination and the way in which cells, enzymes and genes become the work force. Self-production is treated as a factor undermining the assumptions of capital exchange. The project *KAPITAŁ* may be understood as a cynical-utopian attempt/attack on the theoretical basis of capitalism by initiating/making an object/process (VIRUS MARX), which "evades" the laws of capital circulation, e.g. initiating self-producing pathogen, which develops endlessly.⁹

At the end of the 20th century, there was a shift from physical work to work based on monitoring, regulating and controlling machines. Traditional division into live work [human work] and non-live work [machine work] is inadequate: networks and transfers represent the new type of production. We live in the network of transfers, in which more and more new contradictions and conflicts are produced. A new type of power emerges: domination operators have taken a more explicit form and have been merged with regulation systems: in terms of education, law and economy. At least since the time of Foucault, we have known that bio-power, instead of focusing on territorial control and the discipline of individual bodies, has consisted in limiting political powers and ownership rights by developing a special combination of individual responsibilities and supervising institutions. This is the core of liberal policy assumptions. Anatomical policy was based on the discipline of individual bodies in cut-out space – methods of moving across control architecture (prisons, schools, hospitals, banks). In contrast to that, bio-policy is a form of power applied to population as biological species. It applies statistics, demography, the general quantification of a social-political body.

The term "life" is considered to be included in the domain of technique, for economic benefits and for security reasons. Bio-economy. Bio-technological artefacts such as genome data bases or bio-chips represent a special configuration case in respect to production of knowledge and bio-economy. These artefacts are symptoms of productivisation of life. Meta-capital. Everything is partially exchangeable as everything is connected. There is a close relationship between capital and code. Is every code a capital? Is capital a code? Life becomes the currency of the genetic code. Code adjusted to trade, which works as a social marker, as new form of capital.

In 2011, I started to develop the *TRANSAKCJE* project, as a collective framework for tracking information in the network and media. I developed and coded crawlers, realised within the network infiltration strategy. The project is assumed to find out how collective opinions and ideologies are formulated, what makes an individual idea or information transform into a collective system of beliefs. The project shows connections between belief systems and ideologies, which at first sight seem to be totally contradictory. In the project, the autonomy of individual systems is undermined by surprising comparisons and

⁸ Humberto R. Maturana, Francisco Varela, *Autopoiesis and cognition: the realization of the living*, Dordrecht 1980.

⁹ See Robert B. Lisek, *KAPITAŁ* – Muzeum Współczesne Wrocław, <http://lisek.art.pl/CAPITAL.html>.

overlapping. The pathogenic nature of information is revealed, organic willingness for creating new, "transgenic" opinions and doctrines: moving between specific closed sign systems. The project also explores the concept of "expert" and "reliable information." Dominant and non-democratic doctrine says that public opinion is best left ignorant, and the most important issues influencing the policy of human existence should be handed over to experts and specialists, who only talk about their work with the "insiders," meaning people who have certain privileges and stay close to the centres of power. Images building collective systems and doctrines are based on on presumed certainties. Scientific languages, for example, are often used at work and although scientific research is adequately considered in contemporary society as the main source of knowledge, as relates to the industrial, medical and communication context, they show the tendency for alienation rather than explanation. In contemporary culture, we pay a too high price for the comfort of certainty. The project also deals with the concepts of overloading and information entropy. Continuous information supply is fascinating and overwhelming at the same time. Each new element of data offers space for further theories and speculations. The project shows the scale of the information labyrinth. Each new piece of information may offer the key to a potentially new network of meanings or simply shows us that there are more paths than we could imagine. The project *TRANSAKCJE* is presented in the form of a multi-channel installation. The installation bombards spectators with signs and symbols, which relate to specific methods of perceiving or shaping the world. Elements displayed on screens include, among other things: technocratic terminology, scientific diagrams next to philosophical fragments, statistical data displayed next to the representation of organism functions, mathematical equations shown together with plans of military devices and corporate insignia coupled with occultist iconography. These idiosyncratic texts, diagrams and drawings encourage us to consider the conditional nature of representation systems, which form the basis of our individual approach to the world.

Is there a common structure of modern wars, which stays constant in various conflicts in spite of geopolitical or religious differences? What is the connection between terrorism, modern war and globalisation? What is the purpose of war and terrorist attacks? There are common and predictable patterns addressing methods in which people wage wars exceeding definite time and place. These patterns are repeated in many modern conflicts, in spite of geographical, ethnic, ideological and religious differences. They are also very similar to the distribution of victims of terrorist attacks.

What is an ideal terrorist group, the structure of which is the most difficult to destroy? How important is the security policy in creating and developing modern terrorism?

Classically, it is assumed that terrorism is something from the outside, but deeper analysis shows that this is something that the system does for itself. Contemporary terrorism is closely connected with and generated by the security policy. From our point of view, the right approach is to understand the nature of this global regulation. There is no external terrorism. Acts of terror are perceived as mutations and periodic deregulations of the system.

What is the connection between security and the state? Security is the basic rule of the state and the main criterion of political legitimisation.¹⁰ Security and law versus discipline as a management instrument. On the one hand, we have a hard structure of power based on discipline, differentiation and blockades, isolating and closing territories; on the other hand: security policy connected with globalisation, interventions and controlling processes, security connected with liberalism, which may only work in the context of flow of people and goods. The division suggested by Michel Foucault and Giorgio Agamben into hard law and dynamic actions connected with security policy is an artificial assumption. These two areas are closely connected with each other and complimentary, and they act as medium for one another, e.g. processes connected with productivisation of human life, force changes in security policy; on the other hand, legal acts may be quickly changed by elites of power. An increase in dynamics and complexity of social space and brutal forms of politics make this binary opposition inadequate.

Disinformation and mystery. The difference between open and secret information generates hierarchy, which is the first rule of power. On this difference, hierarchies are developed, which are called a state. Limiting access to information leads to the development of various social classes. State security is the engine of violence. Acts of terror and catastrophes are drivers of political actions. That is why they are provoked and stimulated by the elites of power. Security needs constant reference to a state of emergency. Striving for security leads to a global world war.

Another important cause of terrorism is acceleration of transfers and globalisation. We live in societies in which complexity and the pace of flow of information, goods and people is growing due to the automation of processes. This creates new social problems. Just like increasing the metabolic functions of society, such as production and distribution, led to economic globalisation, the automation of information processing leads to the globalisation of human cognitive abilities and decision-making mechanisms. Political activity does not keep up with global finances, weapon trading and drug dealing, exploitation of natural resources, trade with information and people, terrorism. It is a problem that technological progress and automation increase the gap between those who have access to information and those who do not. The result is the emergence of a "sub-class" of people excluded from the benefits arising from information flow.

The project *SECURE INSECURITY* focuses on research of terrorism and security, but it also took form of the *TERRORDROME* – a series of actions resembling a performance, a hacker session, a social sculpture or a concert.¹¹ Acts of *TERRORDROME* may gradually evolve, creating a complex structure, the space of broken ideas, symbols, images and sounds, or explode into a wall of noise. One of the artistic strategies that I use is inversion: analysis of various types of weapons and technologies used by public authorities and then constructing them and making them publicly available to citizens. I presented self-made

¹⁰ See Giorgio Agamben, "On Security and Terror," *Frankfurter Allgemeine Zeitung*, September 20, 2001.

¹¹ See Robert B. Lisek, *SECURE INSECURITY*, ISEA, <http://isea2011.sabanciuniv.edu/panel/secure-insecurity>.

ULTRA HIGH AND LOW FREQUENCY GUNS, which are devices consisting of ultra-high and low frequency wave generators. Similar types of weapons are used to suppress riots, confuse attackers, etc., for example LRAD during Occupy and the demonstrations against ACTA. Other types of EMP weapons based on ultra-low frequency generate electromagnetic impulses able to reprogram and disturb entirely the work of a processor's micro-circuits.

Random processes

What is randomness? Are there random phenomena in nature? I have always been interested in the notion of randomness. Randomness is usually connected with such words as disorder, irregularity and accident. However, creating a mathematically rigorous definition of randomness is difficult. The main attempts are trying to back that with such terms as: stochasticity, instability (Richard von Mises, Abraham Wald); incompressibility (Ray Solomonoff, Andrey Kolmogorov i Gregory Chaitin); uniqueness (Per Martin-Löf); unpredictability (all of the above). In information technology, we are satisfied with pseudo-randomness. Generators of pseudo-random numbers are useful in methods such as Monte Carlo, but in cryptography their application is very limited. That is why, in the Prime Engine project, I used randomness in the form of a sequence of digits from the biggest known, undividable prime number. As pseudo-randomness is insufficient, I started to check processes occurring in nature, which are of random character, like, for example, the decay of radioactive elements. In the ERS project, I used wolfram, thorium and Geiger counters to receive a random sequence of numbers.

Mind uploading

Since 2011, I have been dealing with Mind Uploading problems. In my approach, I have been using partially ordered sets and algebras. As one knows, algebras are very useful in information technology, for example the application of line algebras in machine learning for representation (eigenvectors and matrixes), recommendation machines, matrix distributions and spectral decompositions as well as in numeric optimisation techniques. However, I focused on totally different objects – algebras of William K. Clifford as the ones fitting the issue of building a thinking machine best, in my opinion. The processes occurring in the brain are very complex, so for the needs of building a framework and models, one needs to use complex numbers. However, I am not interested in simulating human brain behaviours. I am trying to create a machine which could solve very difficult problems much better and faster than people. What is interesting, Clifford's algebras have found application in quantum physics (thanks to them, one can easily derivate Erwin Schrödinger, Paul Dirac and other equations). They are also successfully applied in geometry, the so-called geometric algebra, which facilitates a consistent and general description of

various spaces' transformations: 2-3D, quaternions and spinors. The fact that an electromagnetic field is a bivector was used by me for example in the ERS project. The project analyses the influence of the electromagnetic field and radioactive radiation on cells of live organisms. Simultaneously it is realised as a workshop, where interfaces can be developed for manipulating electromagnetic field, sound and light waves.

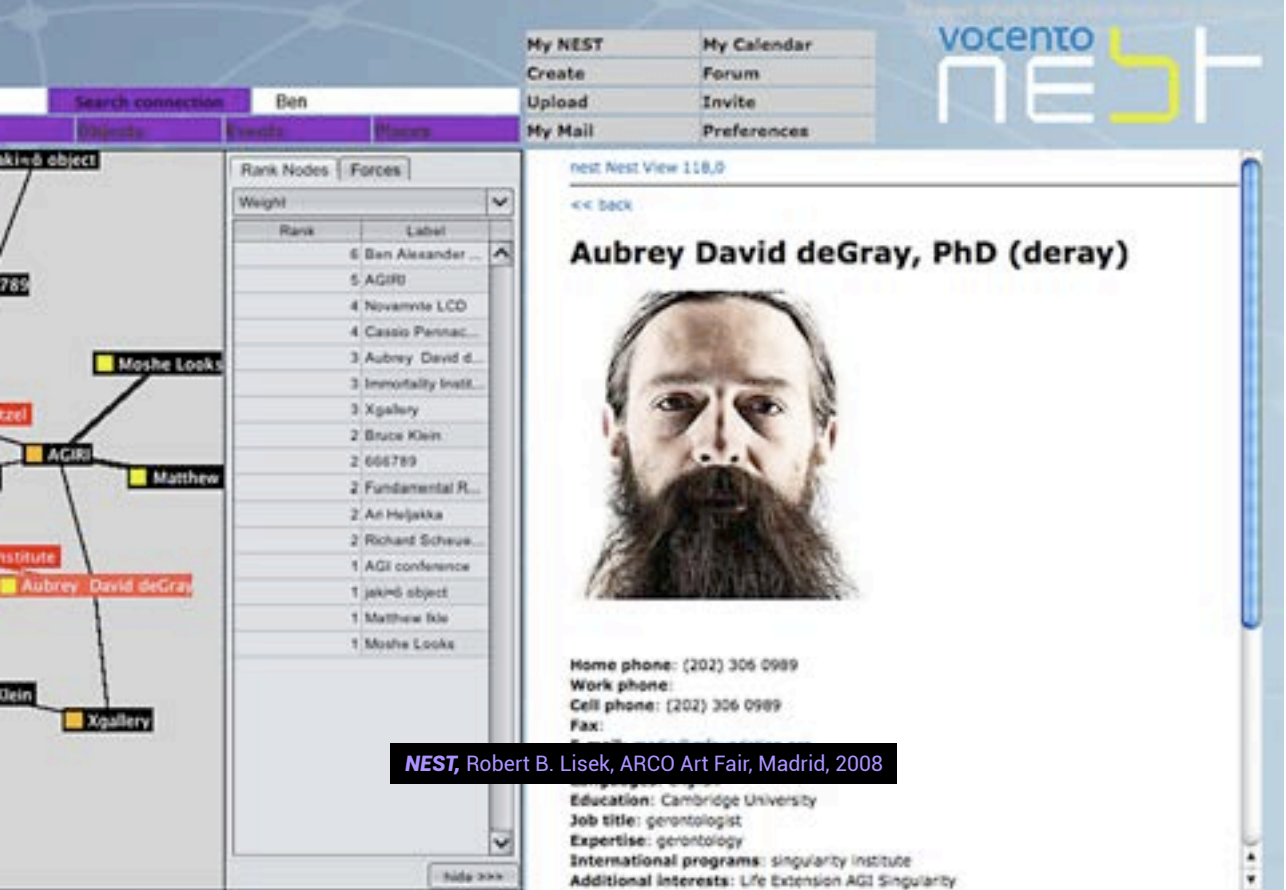
Future of machine intelligence

The beginning of the 21st century featured a great acceleration of research on mathematical induction and the development of Bayes' paradigm. I do not agree with the opinion of Marcus Hutter that we have dealt with the induction problem. Self-improving artificial intelligence (AI) as a golden rule leading to the acceleration of growth in machine intelligence. In this context, intelligence is the ability to achieve targets in a broad spectrum of environments. At present, interesting research is conducted in respect of optimisation and super-compilation. Individual techniques of machine learning are developed, but the general theory is not built up yet. Among different scientific areas interesting synergies occur, for example the influence of the automata concept (Stanislaw Ulam and John von Neumann) on DNA concepts (Francis Crick and James Watson). The development of a fast network of scientific ideas transfer leads to the acceleration of scientific research. In the future, we will publicise ideas even faster, and the most radical and general ones shall lead to the development of new domains. Those really chaotic processes shall trigger sudden cultural growth in shorter time intervals.¹² The long-term future of machine intelligence is connected with the growth of the number of social conflicts. Future scenarios are even more complicated, as some players will be super-intelligent autonomous programmes (AGIs, artificial intelligence agents and viruses). The future is misunderstood. It is assumed that technology and culture development is linear. However, more detailed analysis shows that technological changes accelerate and grow exponentially. These processes occur in increasingly shorter time intervals. The mutual impact of the intertwined revolutionary domains of science and technology leads to the Singularity, a point where we stop understanding and controlling the occurring changes. Therefore, the future seems to be much more surprising than expected by most observers. We are at the edge of changes comparable with the creation of human life on Earth. Within thirty years, we will have the means to create superhuman intelligence. Right after that, the era of men shall be finished.

¹² See David Vernon, Giorgio Metta, Giulio Sandini, "A Survey of Artificial Cognitive Systems: Implications for the Autonomous Development of Mental Capabilities in Computational Agents," *IEEE Transactions on Evolutionary Computation, Special Issue on Autonomous Mental Development*, vol. 11(2), 2007.



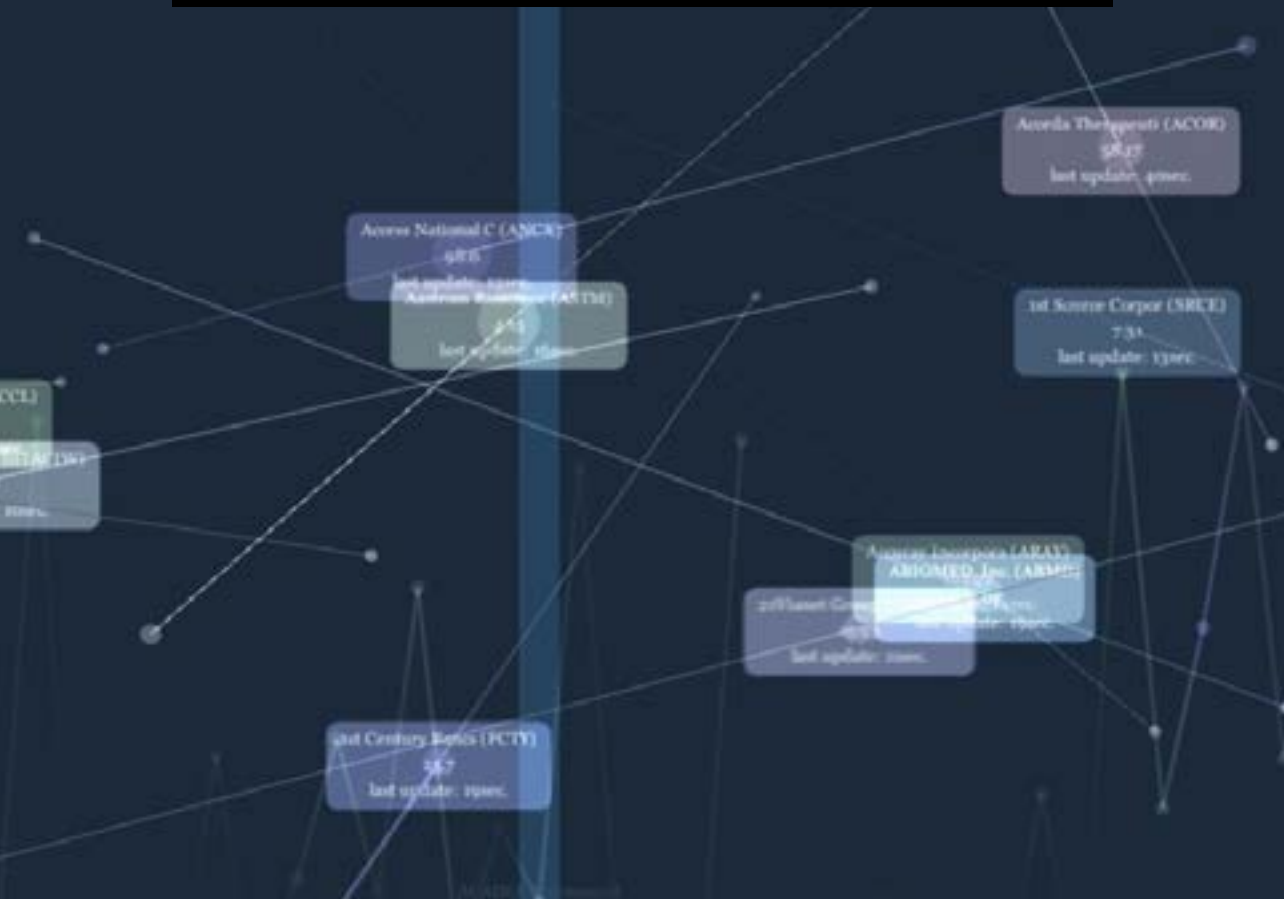
FLOAT, Robert B. Lisek, Lower Manhattan Cultural Council, New York, 2005



NEST, Robert B. Lisek, ARCO Art Fair, Madrid, 2008



Aleastock, Paweł Janicki, from the Center of Contemporary Art Znaki Czasu archive, Toruń, 2013



Media democratisation: Creative programming and the culture of makers

Since the sciences have expanded so much that they have transformed the whole world in a laboratory, artists have per force become white coats among other white coats, namely, all of us engaged in the same collective experiments.¹

Bruno Latour

When laboratory borders were expanded to planetary dimensions, it turned out – as was aptly stated by Bruno Latour at the beginning of the 21st century – that we live in a world of constant experiment and research practices. These occur simultaneously in very different domains. They relate both to theoretical experiments and practical ones, performed in cultural, social, political and economic spheres, but also, as Latour indicated, they refer to ourselves. When today we think about the democratisation of the media, creative programming or the relatively new phenomenon which is the culture of makers, then a paper describing these tendencies must cover two basic and intertwined paths.

The first one reaches back to the 1960s, i.e. to the beginnings of the hacker culture and a broader phenomenon of cultural, political and economic hacktivism. It refers back to the cold war times when in the United States movements sprang up based on recovering media and technology from military and corporate circuits. At that time, the first partisan networks of information exchange and video-spheres started to emerge, which were developed on the bottom-up basis by various social groups. The generation brought up on the contents of the book entitled *Understanding Media* by Marshall McLuhan from the very beginning searched for new practices of creatively utilising digital tools. This approach to techno-cultural transformations within art and various activities from the borders of science and technology in one of its branches developed the hacker culture at the beginning of the 1990s. Artists involved in that movement as well as engineers and programmers, through their actions, performances and creative coding strategies, expressed their dis-

¹ Bruno Latour, *Olafur Eliasson: The Weather Project*, exhibition catalogue, London 2003.

satisfaction with the various political and social situations that were taking place locally and globally. They became an anti-system movement – conducting actions which revealed information hidden from public opinion. The importance of contemporary hacking mechanisms, which were in reality connected with transforming information into goods, was described by McKenzie Wark in 2004 in his famous book *Hacker Manifesto*.² As he described it, modern hacking is no longer limited to a specialist information technology and programming workshop – it extends over the entire sphere of media, politics and social activities.

The second path also has its roots in the cultural-social-scientific transformations of the 1960s, but it is a strategy of alternative methods of participating in culture, of building and introducing modifications into the mainstream. This is more about the constructivist approach which is designing new forms of dynamically developing network societies. At the same time, the idea of a network is not only perceived in the digital context – it describes the relationship between the participants of the culture of makers who exchange tools, knowledge and skills.³ Besides, to a certain extent the culture of makers which started to quickly develop at the end of the 1990s, together with its whole infrastructure consisting of a network of studios, workshops, media-labs, fab-labs and hacker-spaces, is a certain form of breaking off the fascination with the virtual world which originated in the 1990s. On the one hand, creating physical objects facilitates feeling the material dimension of joint work, and, on the other hand, it anticipates the updated envisagement for techno-culture development, i.e. the Internet of Things. Because, in reality, objects designed and created in fab-labs are not only material world objects but they exist in the *augmented reality*, thus contaminating the features of a real and virtual reality. That is why it is so important from this perspective to connect the programming, engineering and designing competencies occurring in the process of joint team projects as realised by the makers. Many active movement members claim that it was the garage projects – started on a private scale in the 1960s – which finally led to the digital revolution,⁴ of course making Steve Jobs and Bill Gates the icons of this process. The maker movement in itself has nowadays been the seed of the next industrial revolution.⁵ It is the fact that cooperation strategies sourced by the movement's first developers led, on the one hand, to the creation of culture-breaking devices such as 3D printers and, on the other hand, they provided social support for making some technologies publicly available free-of-charge, e.g. Arduino. It is difficult to say unanimously whether the culture of makers is using subversion with respect to corporate technology culture, or perhaps it is rather its part which facilitates experimenting, prototyping more quickly and testing various solutions on

² McKenzie Wark, *Hacker Manifesto*, Harvard 2004.

³ On the influence of the network model on social life, see: Nicholas A. Christakis, James H. Fowler, *Connected: The Surprising Power of our Social Networks and How They Shape Our Lives*, New York 2011.

⁴ See Walter Isaacson, *The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*, New York 2014.

⁵ Chris Anderson, *Makers: The New Industrial Revolution*, New York 2014.

a limited group of users. It is also true that all interesting phenomena in the global economic system which can offer something innovative are copied and commercialised by large players very quickly. So, the game is not only about the constant attempt to recover fragments of technological culture by independent artists but also about the constant escape from market mechanisms.

Let us return for a moment to the term of media democratisation. The term, which raises many theoretical conflicts in this text and in the whole project of the book entitled *Sztuka i technologia w Polsce. Od cyberkomunizmu do kultury makerów*, is not construed as a clearly positive phenomenon and to a certain extent is connected with the imperative of neo-liberal ideologies ordering the search for and usage of still new tools and forms of communication. So, democratisation is a certain consequence of global techno-capitalism, which had particular importance in the context of Poland after the change in 1989 and generated a very complicated combination of tendencies, relationship, politics and processes.

Coding reality

Code is not purely abstract and mathematical; it has significant social, political, and aesthetic dimensions. The way in which code connects to culture, affecting it and being influenced by it, can be traced by examining the specifics of programs by reading the code itself attentively.⁶

The authors of a book published in 2011 entitled *Code/Space. Software and Everyday Life*, i.e. Rob Kitchin and Martin Dodge, proved the need to introduce into *software studies* a new category, that of code/space. Contemporary technologised and mediatised life spaces do not only have a physical dimension, and the issue of extended reality is no longer sufficient to define them. According to the researchers, the categories of code, software and space today create one joint dimension of a new geography. A combination of these two once separate categories is so strong that one cannot explain the phenomenon by using the definition of a connection or combination – they have just become one ratio of a code which is space and space which is a code. Kitchin and Dodge's analysis goes further than the previous considerations of Lev Manovich that were made in *Software Takes Command*, in which the author presented the fundamental impact of software on the operations of contemporary economy, productivity, policy, society, etc. In Manovich's view, these were still systems, which obviously could not be turned out painlessly, but they were defined as the techno-sphere which entwines reality. In the proposal of the two geographers Kitchin and Dodge, global change is based on the fact that in a techno-cultural reality a code is space, so it is not external to it or separate. The researchers even name a new cyber-geographic unit which they call code/space. This cannot be compared to the meta-

⁶ Nick Montfort, Patsy Baudoin, John Bell, Ian Bogost, Jeremy Douglas, Mark C. Marino, Michael Mateas, Casey Reas, Mark Sample, Noah Vawter, *10 PRINT CHR\$(205.5+RND(1)): GOTO 10*, London 2013, p. 3.

phor of computation in the cloud either – we are all aware that we have resigned from storing data on carriers which we physically hold, and although it would seem that they truly are a certain invisible “cloud,” then still each bit of information is located somewhere in a specific part of a physical carrier which we just do not see. The code/space is another research proposal which tries to collect all phenomena of software existence in the contemporary globalised civilisation, i.e. from the amount of transferred data, through management systems, physical extended objects expanded in the Internet, to the administration systems and consumption mechanisms of contemporary societies. Therefore, in the techno-cultural reality we dwell in the code/space, in which everything that is physical or material is ontologically combined with what is virtual. The consequence of this situation is also the fact that both of these once binary terms start to interfere with each other, thus blurring the borders of their previous semantic areas. Just as Gilles Deleuze once declared, anything that is virtual does not object to that what is real, but only to that what is current. The virtual is fully real as virtual.⁷ As Kitchin and Dodge claim, expanding Deleuze’s thesis, the virtual is therefore an update in reality, and their co-existence creates new code/space dimensions.

In such a situation, artistic practices which reach for creative programming tools turn out not only to be adequate to the reality in which they occur, but also facilitate introducing critical levels already in the sphere of the tools themselves. For this reason, *creative coding* in many artistic events can be treated as the meta-language of media culture – analysing and redefining in general the coding situation as a communication strategy. In numerous cases the coders reach for the sphere of residual data circulating the network and creating a low-information hum. The so-called *capta*⁸ are fragments of information (*data*) originating from the sum of potential data on a specific object. *Capta* distributed in the network create a *capta shadow*, i.e. fragmentary representations or shadows of data describing people, objects or procedures. It is this hum of data fragments which is subjected by many artists to artistic and research procedures – such as transcoding, visualisation or sonification. Focusing on data as the basic building material of the language of the arts introduces them to the sphere of newly perceived conceptualism.

One example of this type of practices is *Aleastock*, an interactive installation by Paweł Janicki from 2013. As Janicki says: “In a way, *Aleastock* is a parasite living in the body of capitalism.” The core of the work is the visualisation and sonification of data collected from different levels of information describing the activity of stock exchange companies quoted at NASDAQ. Both the presence and motion of the spectators and the manipulation made by them with the use of smartphones and tablets are important for the general result. That is how the installation becomes a critical measurement tool for tracking the condition of the contemporary global economy, i.e. by using information which as a rule is hidden from broad public opinion.

⁷ See Gilles Deleuze, *Difference and Repetition*, transl. by P. Patton, New York 1994, pp. 168–220.

⁸ For a definition of *capta* see: Rob Kitchin, Martin Dodge, *Code/Space. Software and Everyday Life*, Cambridge 2011, p. 261.

Marcin Ignac also deals with the visualisation of data. In *Every Day of My Life* (2012), by using creative coding Ignac, in the form of ascetic graphs, presented a visualisation of his own activity on his private computer in the years 2010-2012. A collection of colourful lines formed a set resembling a scientific measuring graph. Each line represented a separate day and each colour on the line was appropriated to other activities done on the computer. The graphical representation of the author's daily activity created something like a *capta shadow*, i.e. visualised, difficult to identify fragments of information being a collection of data on one object.

Another strategy of data visualisation has also recently been shown by Szymon Kalski in his work *Biomimesis: Hyphae* (2013). This is an interactive installation which is activated by the presence and motion of spectators in space, and it takes up the problem of visualising biological algorithms. A mathematical model developed on the basis of an analysis of mould growth is transferred to a computer. The organism starts to grow, appearing initially in a random place, and then aiming in the direction of areas where the motion of spectators is detected. It is the activity of the spectators which accounts for the food of the virtual organism. If there is no person around the installation, the organism dies. These types of actions may be perceived as a form of *life coding*; if classical *life coding* in its basic form is connected with hacking DNA and all biological material, then in this case it is the life development procedure which becomes "hacked."

Data circulating the network is often so defragmented that it cannot be read as information – it just becomes something that the authors of *Code/Space* call metadata describing the subordinate values of information itself. In this context, using such types of actions in artistic performances is a form of operation made on the deeper structures of the cultural experiences of contemporary human beings. Such work processes the information atmosphere, which defines contemporaneity in a significant way and takes part in the creation of a widely distributed shadow of identity of facts, objects, persons, processes, events, etc. woven from data scattered in the digital world. On the one hand, the above examples somehow destroy superficial audio-visual structures in order to reach for the language in which they are expressed, i.e. the language of data with a view to "re-expressing" them but in entirely different, original outputs. This gesture is most often meant to either indicate the manipulation strategy at the very code level, which may influence an unaware user, or is revealed at one situation surface, i.e. at processes which are invisible, fragmental and scattered along various areas of techno-culture. As regards creative coding, we are dealing here with numerous phenomena and approaches as well as with understanding the procedures of data operation. In the code/space that surrounds us, digital art becomes a meta-system using meta-aesthetics, which tries to define anew what contemporary forms of artistic expression truly are. In a work using creative programming, coding does not only have the status of a tool which facilitates achieving the intended effects, but it penetrates the composition and ontological structures of works. Interfaces dominated by visual network structures, or *live coding* which allows spectators to see

directly the lines of a programmed code, are strategies aimed at revealing the multi-layer structures of contemporary space, in which in line with the code/space theory, data has turned into molecules of the surrounding atmosphere.

Prototyping reality

MAKE

Making is fundamental to what it means to be human. We must make, create, and express ourselves to feel whole. There is something unique about making physical things. These things are like little pieces of us and seem to embody portions of our souls.

SHARE

Sharing what you have made and what you know about making with others is the method by which a maker's feeling of wholeness is achieved. You cannot make and not share.

...

PARTICIPATE

Join the Maker Movement and reach out to those around you who are discovering the joy of making. Hold seminars, parties, events, maker days, fairs, expos, classes, and dinners with and for the other makers in your community.

SUPPORT

This is a movement, and it requires emotional, intellectual, financial, political, and institutional support. The best hope for improving the world is us, and we are responsible for making a better future.⁹

The maker movement is a relatively fresh phenomenon, although in its ideas it relates to artistic practices that started back in the 1960s and to the first generation of artists originating from the environment surrounding Stewart Brand and the "Whole Earth Catalog."¹⁰ An unresolved issue is the answer to the question – is the maker movement a live continuation or rather a commercialised tendency. Each of these answers is partly correct. However, it is difficult not to notice that using the DIY (do-it-yourself) strategy in contemporary reality actually engulfs the tradition of social resistance. Self-making is a form of critical analysis, a strategy of cognition and of learning techno-culture. Through device hacking it is possible to analyse their functions, and not only the technical ones but also the socio-cultural ones. This follows from the possibility of getting to know a technical project and its applications in-depth. It is an entirely different experience to simply use something and then entirely different again to make it. By spoiling a ready project, remak-

⁹ Mark Hatch, *The Maker Movement Manifesto. Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*, New York 2014, [electronic publication] loc. 11–13.

¹⁰ More in Agnieszka Jelewska, *Ekotopie. Ekspansja technokultury*, Poznań 2013.

ing it and adjusting it to one's own needs we in a sense get to know its coded idea and operation concept, which is embedded in it economically and even politically.

In recent years in Poland there have been many initiatives and locations which constitute the brand sign of the makers' culture. There is practically no larger town which would not have its own independent fab-labs, hacker-spaces or media-labs. New festivals have emerged on the map of fixed cultural events, and their purpose is to show and popularise these types of activities as well as the whole network of periodic workshop meetings during which the makers exchange their experiences. From the perspective of social-cultural changes in Poland, these tendencies are extremely interesting and seem to prove that technological culture and media democratisation are treated seriously. Self-making practices, which in the 1970s and 1980s in Poland could be associated, on the one hand, with entrepreneurship as a result of a lack of access to many products and, on the other hand, with Adam Slodowy's television programme, have now regained their social-making importance. This is no longer only about a hobbyist's fulfilment of a maker's passions or about making up for shortages in a home's infrastructure. Making has become creating and a form of participating in a specific movement and in the practical workshop itself. The set of skills does not only serve to accomplish a specific project but becomes a form of an alternative "drift" among objects of techno-culture. Creative utilisation of knowledge and skills and sharing artistic experiences all become at the same time signs of resistance against hyper-consumptionism. Prototyping is not only a method of the fast development of working models in small independent workshops here – it is a form of designing a new social relationship. Thanks to free licences to use technology, all of these actions may have the nature of not only micro-environments but create a global network of connected local communities.

Open source hardware is truly huge. With a little bit of effort and training, you can make your own electronic things. And you don't need \$100,000 of design software, manufacturing experience, or years of dedicated software training. If you don't want to develop using the Arduino platform, it's possible to hire people for a reasonable rate to do the work for you, and they don't need to support hundreds of thousands of dollars of infrastructure costs. Arduino-based prototypes are also easy to change. They are fully programmable. So if the first effort doesn't work, you just keep hacking at the code until the device does what you want it to do.¹¹

Many media projects have come up in recent years in Poland. Among them, particularly interesting were, for example, operations of the group called panGenerator (Piotr Barszczewski, Krzysztof Cybulski, Krzysztof Goliński, Jakub Koźniewski). The *Dodecaudion* (2011-2012), created by panGenerator, is a hardware object which has the shape of a dodecahedron and which facilitates in controlling, among others, music and video software with hand motions in the air. The *Dodecaudion* allows artists to expand kinetic expression during electronic music performances or to build video structures live. Each wall of the

¹¹ Hatch, op. cit., loc. 171–172.

controller is equipped with an infrared sensor responding to the movement of objects within its reach. Another of the team's project, *Tactilu* (2013), is a bracelet put on the wrist which is able to transfer the sense of touch between two remote users. The project was realised in co-operation with the Itaka Foundation, which deals with searching for lost and missing persons.

Designing controllers, instruments and sound mechanisms is one of the most developed tendencies among young artists. In 2013, Michał Szota presented his *Instalacja telefoniczna (Phone installation)*, a music controller built on the basis of telephone dials which were manufactured in Poland in the 1970s. Sound is made on this instrument by way of dialling numbers. Szota's use of old telephone dials from devices that are no longer produced is an example of one of the more important strategies of the new makers' culture. The economic life cycles of objects make technological tools much cheaper, besides, the growth of the techno-sphere is so fast that more and more technical devices become "obsolete" and only wait to find their new life in media projects. Technologies discarded by the market become an area which forms the basis for independent projects, for art which is not focused on effective development but on exploring the techno-sphere in searching for still empty or already deserted domains. In this context, on the one hand, such activities are of a pioneer nature, i.e. looking for innovation, and, on the other hand, they utilise everything that has been pushed outside the brackets of technological attractiveness.

The practical ability to construct, design, build, create and co-share is a method helping to create new social networks of relationships. In the projects above this is not only about the objects built, about things with interactive functions. An important purpose is communication and establishing a relationship with other users. The panGenerator group in their actions often refer to the term of critical design, recalling, among others, the works of Krzysztof Wodiczko, and although at first sight this may seem to be an exaggerated comparison, then still the core of critical social reality analysis is embedded in these projects. However, critical comments do not refer directly to painful historical experiences but to the digital-network structure of contemporary reality along with the repertoire of personal and social experiences that it produces.

While at the brink of another revolution, which will be brought into reality by the Internet of Things – we must realise that making physical objects will become more and more important. The network will in a short period of time not only have a virtual dimension but also a physical one. Each of its users – if only they hold adequate skills – will be able to connect any physical object to it. In this context the manifest of makers refers to artisanal traditions, to the Greek *techné*, simultaneously sourcing information from hacking strategies. In spite of the critics indicating that the makers do not have a clear approach to the commercial sphere of technological culture, the movement is focused on recovering and developing the network in the future; on building local connections which might to a certain extent be individually developed and controlled. Individual devices designed and made in small laboratories-workshops are a sort of technology that is imperfect but existing in the culture as an alternative to commercial technologies.

New collectivism

Creative coding and the practice of the makers are two important phenomena impacting the participation dimension of techno-culture. These are not only actions focused around the arts but also cover with their range political, economic and social spheres. In many cases these are phenomena which, as McKenzie Wark says, “a collective, collaborative practice of creating new forms that are not purely formal, but are proposals for forms of life.”¹² In an interview given to Geno Moreno, the researcher emphasises the importance of collective practice with respect to shaping contemporary culture, in which designing is not only prototyping the social relationship but is also anti-social or anti-system; where whatever is human creates an assemblage with the non-human (e.g. devices and objects, but also hacked network fragments). What this means is that these practices create micro-spheres which are immersed in the global economic system and have a chance and opportunity to make new forms of participation through building new collective practices of recovering tools, materials, fragments of code and information. These are the kinds of practices that McKenzie Wark could refer to by saying that “they stop being auto reference games,” and they take part in creating new assemblages between what is human and non-human, between culture and technology, but also between collective actions and the policy of supply and demand. Therefore, as Bruno Latour said, the world is becoming a gigantic laboratory in which every day different actors prototype and search for not only new solutions to problems facing humanity on a daily basis, but also for new connections and the catalysers of these transformations, while the participation practices referred to above become one of the most important strategies of conscious and effective game playing, both locally and globally. Nowadays nobody has the monopoly for solving the problems and crises of contemporary reality – that is why collective experiments are so important, as they involve not only makers, engineers, architects and researchers but also non-human actors (both technological tools as well as material and non-material objects).

¹² *New Ancestors: A conversation with McKenzie Wark*, <http://www.e-flux.com/journal/new-ancestors-a-conversation-with-mckenzie-wark/> [accessed: 10 August 2014].



AMANDA

TACTILU

SAMPLE USE SCENARIO

GEORGE



AMANDA HAVE SENT ENERGETIC POKE TO GEORGE JUST TO REMIND HIM ABOUT THEIR UPCOMING MEETING

GEORGE JUST RECEIVED BRIEF & ENERGETIC TOUCH FROM AMANDA SO HE FEELS EXCITED ABOUT SEEING HER SOON

Tactilu, panGenerator (Piotr Barszczewski, Krzysztof Cybulski, Krzysztof Goliński, Jakub Koźniewski), 2013



Instalacja telefoniczna (Phone Installation), Michał Szota, 2013



Conclusion: Symbiotic tangles

In the emerging, highly programmed landscape ahead, you will either create the software or you will bet he software. It's really that simple: Program, or be programmed. Choose the former, and you gain access to the control panel of civilization. Choose the latter, and it could be last real choice you get to make.¹

Douglas Rushkoff

There is no doubt that it is difficult to create a whole and model description of a given phenomenon when its development phases are being shaped. Today we face a whole range of new practices, tendencies and periodic events, which have been discussed in this book individually by different authors and all of which compose a dynamic and a non-uniform landscape of techno-culture. An important feature of this publication is the fact that individual findings have been made by internal users, i.e. direct co-makers of the described tendencies. Therefore, an external, critical analysis of these phenomena shows up mainly in between individual texts – in the entirety of the publication – and it indicates the variety of analytical tools and theoretical models or methods used to define specific tendencies. The transformation from cyber-communism times to the contemporary culture of makers, as recorded in this book, and its approach to connecting the arts and sciences has overlapped in our country with democratisation processes. Apart from the obvious fact that system changes occurred after 1989 – the term “democratisation” that we use engulfs the additional change in the methods of defining and utilising technical media. In the 1990s we could experience to a large extent the situation of a consumption-focused approach to the sphere of media, but in the new millennium, together with the emergence of strictly independent DIY environments, the media have hugely been subjected to new democratisation processes. The social approach to their function in artistic circles has changed, as well as the methods and strategies of media utilisation – expressed in turn for “recovering” the technological domain for social purposes. One must notice that to a certain extent these are tendencies which are reminiscent of events taking place in the United States in the 1960s and 1970s, and which were focused around the Californian

¹ Douglas Rushkoff, *Program or Be Programmed: Ten Commands for a Digital Age*, New York 2010, pp. 7–8.

avant-garde and individual groups in San Francisco². Nowadays, actions based on shaping the forms of media exchange or of recovering specialised military technology for artistic and social purposes have a much broader scope and thanks to network communication they exceed national boundaries, thus becoming a global tendency. New methods of “hacking” the media are of key importance in this respect as they allow local communities to establish their own communications structures, to build their own technological interfaces, and to educate themselves through “cheap” (meaning open source) technology. Media democratisation, therefore, gives the opportunity to choose between participating in the consumer culture of large producers and to turn to independent systems created in line with the slogans of the first hackers from the 1960s. That is also why such issues as network hacking or access to free culture have become extremely complicated today, as, on the one hand, they are immersed in a still ailing legislation, and, on the other hand, in the spheres of interest of large players of consumer culture. The possibility to make a choice between fitting into commercial models and democratised practices is extremely important – especially in Poland, in which right after system changes and developing a new political-democratic identity we must constitute ourselves in the reality of digital globalisation. And, in relation to these processes, new art has an extremely important role to play. Contemporary artistic practices, regardless of whether they are officially introduced into the art domain or, on the contrary, consciously operate on its boundaries, address these most important issues. Not mentioning them, leaving them out of the humanist, philosophical discourse, which is often experienced in Poland, increases the effect, referred to by Lawrence Lessig, of media illiteracy, which is the lack of skills to use modern tools responsibly, and which results in producing a society of hyper-consumers.³ New artistic practices are focused on actions within the aforementioned techno-culture, which is a combination of what used to be defined as separate areas and today has to be presented jointly as a phenomenon expressing the changes that have taken place in contemporary times. In this book we tried to show the relationship and connections between art, science and technology by taking into account the determining influence this hybrid combination is having on transformations in social life. On the grounds of numerous doubts and understatements occurring between society and techno-scientific systems, increasingly important artistic practices are starting to emerge which are defined all over the world as *art&science*. In recent years there have been many phenomena in this area in Polish art. New artists have emerged on the artistic scene who in many cases do not even have a college education in the arts or even in the humanities at all. Among them we shall find not only designers but also programmers or engineers. And even if they are art college graduates, they still supplement their artistic practice with new technology competencies. On the one hand, this is a return to practice which we could generally call *techné*, but, on

² See Agnieszka Jelewska, *Ekotopie. Ekspansja technokultury*, Poznań 2013.

³ See Lawrence Lessig, *Free Culture*, New York 2004, [online], available from: <http://www.free-culture.cc/freeculture.pdf> [accessed: 6 December 2013].

the other hand, the advanced tools used by the artists (no matter if these are programming or designing tools) are subjected in many of their actions to a deep analysis. Critical strategies with respect to such practices connected with widely perceived technological art are not absolutely clear. The criticism often becomes very direct – just like in the works of Robert B. Lisek – showing the abuses and manipulation possibilities connected with a techno-capitalist system; whereas in the works of such artists as Paweł Janicki the critical level is hidden in the designing mechanisms, which reveal spheres of hidden information circulating the network in the process itself. The youngest generation often reaches for other strategies – connected with the recovery of technology; for example, the panGenerator group design their technological interfaces by recalling *open source* technology. This way, such devices are created which can potentially be made independently by each user, thus utilising the Internet support of the *makers* environment. In this case, criticism is reflected in rejecting the world of corporate technologies and in choosing technologies from the domain of DIY (do-it-yourself), free from supervising commercial mechanisms. The latest of these strategies has gained in strength and is one of the most characteristic features of contemporary society of knowledge. Workshops, *shares*, co-working spaces, fab-labs, social workshops – have all become forms of small independent institutions constructing techno-culture practices in the bottom-up style. In this context it is a value in itself to reject the role of the consumer and to become a creative designer making one's own hardware and software. This type of action does not only have a dimension of the pragmatic creation of "customised" electronics (such which fulfil the individual aims of the maker), but in reality this is something much larger – it is a deep criticism of the digital consumer culture in which most users move along paths predefined by corporate-political strategies. Such a culture is in danger of passivity, and even if it provides us with quasi-creative tools (e.g. software for artistic work), it still leaves us on lost ground, i.e. expressed in the limitation of: I will only do as much as the tools designed by someone else allow me to do. Therefore, an important element of artistic actions today is not only to make objects and to create artistic experiences themselves, but also the author's own tools, which break free from the consumer society without licence complications arising from the usage of commercial equipment or software which do not define the artistic workshop. That is how the makers' culture is established, i.e. a culture of people consciously shaping technological tools, practising a new level of democratisation as a form of media recovery and exchange, and subjecting in this way to an analysis all deep structures of culture rather than their visible consequences in the form of ready-made products. In this context, practising art on the verge of science and technology has a performative dimension, i.e. in redefining techno-culture in a process in which art itself originates. From this perspective, digital art itself often adopts the functions of a meta-system using meta-aesthetics. This allows the redefinition of forms of artistic expression in the new media reality.

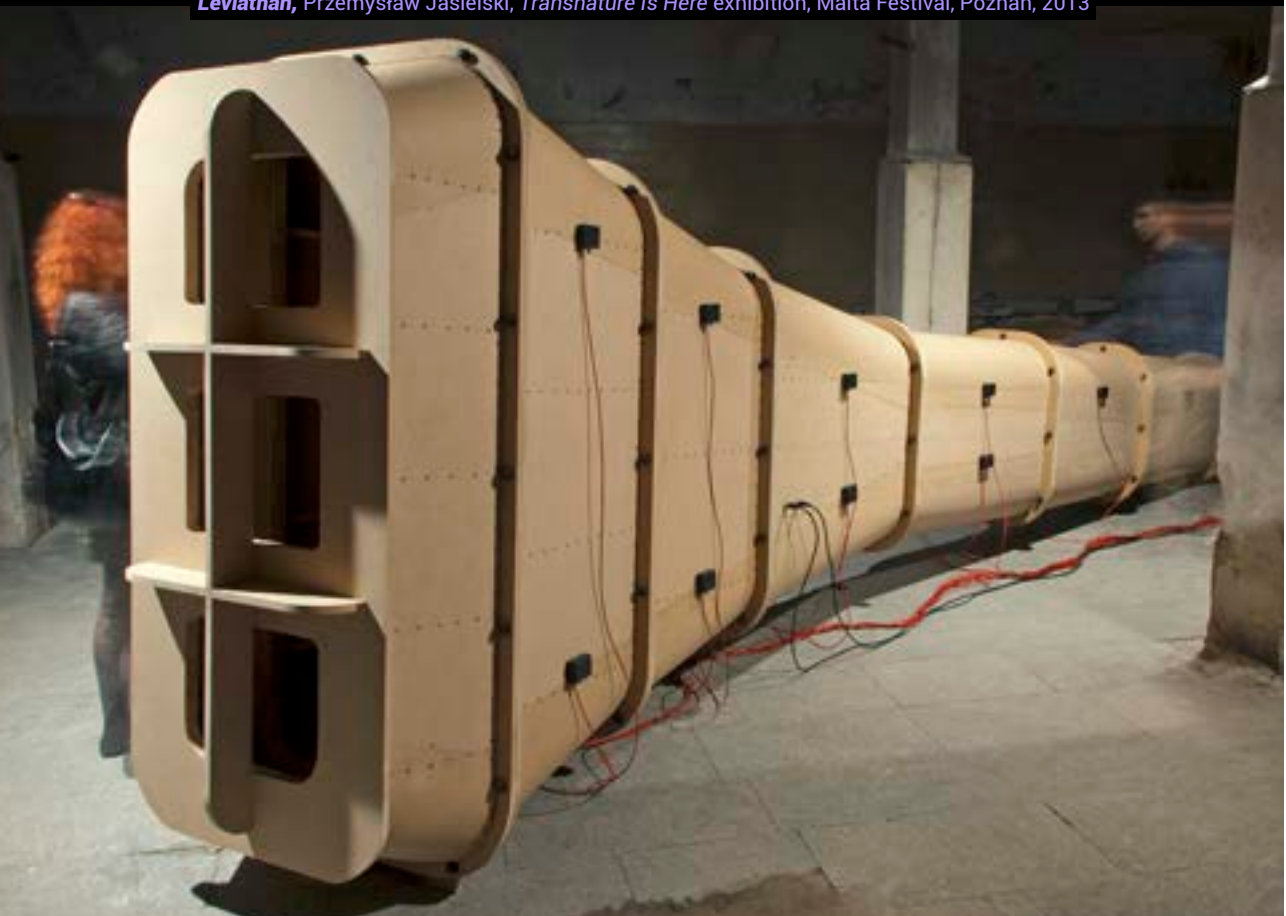
Similarly important is art actively utilising scientific cognition strategies. In a reality in which science fulfils functions conditioning the development of civilisation and its isola-

tion from social or cultural systems, this may lead to ostracism with respect to modernity and misunderstanding the world we live in. Scientific laboratories operate within culture as extraterritorial places, as autonomous outposts managed by their own rights and logic. This situation, however, may pose a danger with such intensive scientific development going on. Scientific acceleration must take place in a relationship with the evolving society, and in this scheme art plays an extremely important role of a translator and mediator – on the one hand, it develops the social-cultural foundations for expected scientific breakthroughs, and, on the other hand, it has the potential for critical immersion into closed laboratory structures.

The Interdisciplinary Research Centre Humanities/Arts/Technology (HAT Research Center) that we established in 2011 at Adam Mickiewicz University in Poznań is a response to the urgent need in Poland to build a bridge between the contemporary humanities and techno-scientific reality. This situation provokes us to reach not only for tools of academic discourse but also for practices characteristic of techno-culture. In the past few years, many workshops, lectures, projects and exhibitions have been conducted within the operations of the HAT Research Center. Among them there have been such events as workshops with youth titled *We, The Children from Project Earth*, within which we jointly revalidated private histories from the perspective of the Anthropocene theory, lectures and meetings with foreign guests, e.g. with Prof. Roy Ascott or Prof. Jill Scott, or an international conference titled *Post-Technology Experiences*. In 2013 we curated *Art-Science-Culture*, with a series of exhibitions from the art&science area, as well as the exhibition titled *Transnature Is Here*, attended by Przemysław Jasielski, Rafał Zapala, Marek Straszak, Tomasz Gęstwicki, Szymon Kaliski and Patryk Lichota. In this project we confronted artists with breakthrough research achievements in the area of bio-communication, bio-acoustics, cognitivist science and scientific philosophy. The project, during which we jointly tried to address new definitions of intelligence, life, communication and the place of humans among other live (live and not-live) systems of being on Earth, provoked many discussions and became, in a way, an intellectual mechanism of understanding the techno-artistic-scientific reality. For us this has been proof that artistic, designing, curator, critic and scientific work creates a symbiotic organism of the contemporary humanities in which isolated theories are difficult to be defended and practical actions become a type of test verifying the durability of a specific structure. In this context, the humanities become clear only in connection with new artistic practice, scientific theories and technological tools in the process of joint negotiating of the shape of reality.

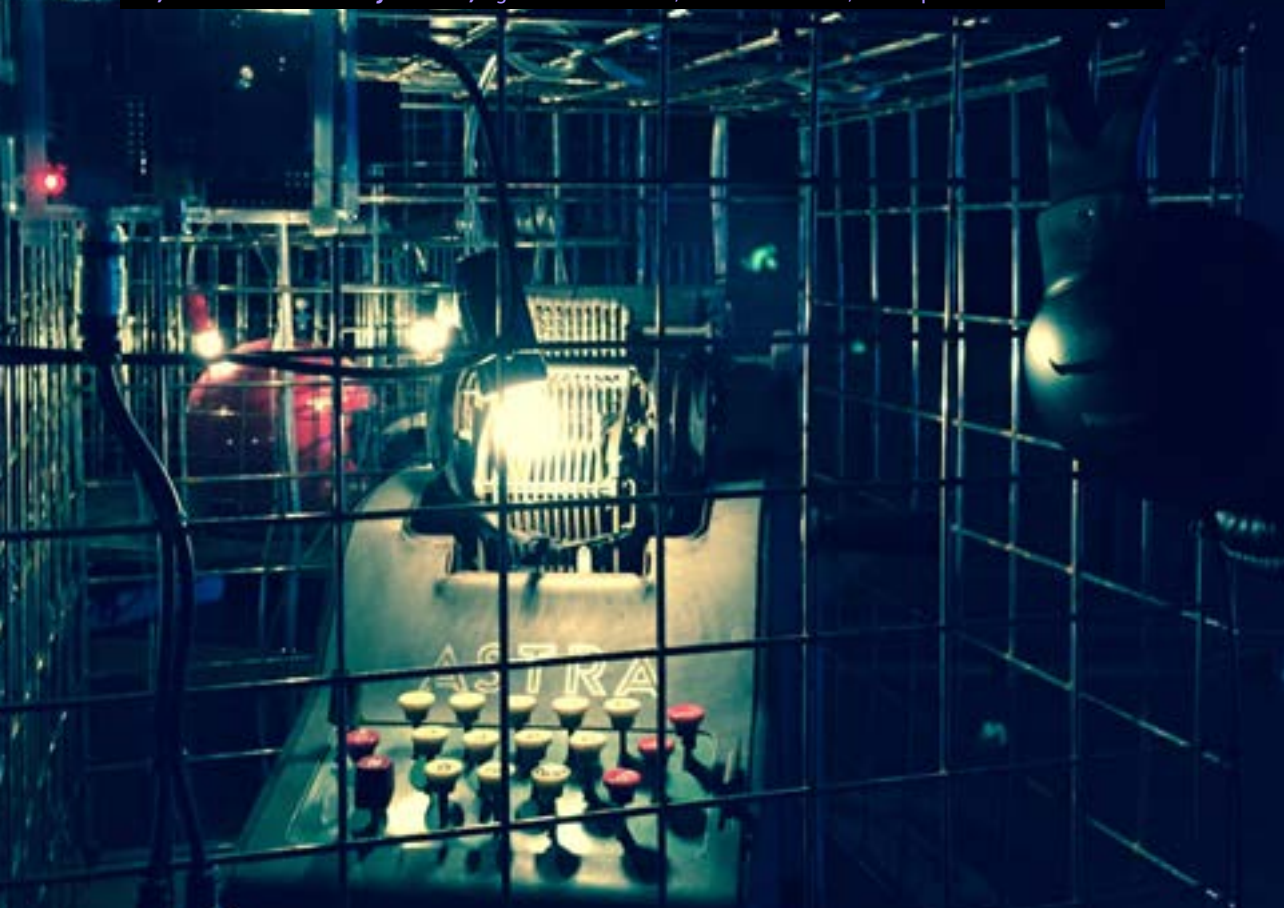


Leviathan, Przemysław Jasielski, *Transnature Is Here* exhibition, Malta Festival, Poznań, 2013





We, The Children from Project Earth, Agnieszka Jelewska, Michał Krawczak, Wielkopolska Revolutions 2014



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Robert B. Lisek – artist, mathematician, hacker, composer examining the working of the human brain, experimenting with processes (computational, biological, social). Moving through conceptualism, hack-

tivism, the art of software and radical social interventions, his activity does not yield to pigeonholing. Pioneer of an art using the methods of artificial intelligence and bioengineering. Author of many radical projects dedicated to alternative strategies in art. Lisek is moreover a scholar specialising in the theory of partially ordered sets, algebra and combinatorics. Author of over 100 exhibitions and papers. Founder of FUNDAMENTAL RESEARCH LAB.

Mariusz Pisarski – doctor of humanities, author of the book *Xanadu. Hipertekstowe przemiany prozy* (Kraków 2013), editor of *Techsty* and the multimedia mutation of “Ha!art” website. Took part e.g. in the creation of the first Polish hypertextual novel titled *Blok* by Sławomir Shuty (2003), prepared a hypertextual adaptation of Jan Potocki’s *Manuscript Found at Saragossa* (Ha!art 2012) and an online adaptation of Bruno Schulz’s short stories (*Bałwochwał*, 2013). Editor of books *Hiperteksty literackie, literatura i nowe media* (2011) and chapbooks *Obsessive anticipation* (2013), *Hyper(de)Scripton. On film-poems of Katarzyna Giełżyńska* (2012) [with Piotr Marecki] and editor of his own chapbook *Michael Joyce. Polski pisarz* (2011). Collaborates with the Electronic Literature Organization, ACM member. On a daily basis works in a bookstore in Notting Hill, London.

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Magdalena Zamorska – doctor of humanities, culture studies expert, translator, dramaturge; adjunct at the Wrocław University Institute of Culture Studies. Completed a research project at the Institute of Music and Dance *Multimedia: strategie wykorzystywania nowych mediów (elektronicznych, cyfrowych) w polskim nowym tańcu*. She has published in numerous magazines, e.g. *Kultura Współczesna*, *Didaskalia*, *Teatr*. Author of the book *Obecni ciałem. Warsztat polskich tancerzy butō*.

Rafała Zapala – composer, improviser, sound artist. An associate professor at the Musical University in Poznań. Zapala does not recognise any boundaries between music acquired through academic education, experience of the counterculture and collaborating with artists from other fields of art. His music is presented at contemporary music festivals, jazz clubs, experimental music venues and open, public spaces. Artist-in-residence at, among others, Stanford University–CCRMA (2014), Culture Center “Zamek” (2014), Swietokrzyska Philharmonic (2014/2015). Co-founder of many ensembles and music projects (contemporary composed music, improvised music, electronic and experimental music). His concept of Live Electronic Preparation is published at Oxford Handbook of Interactive Audio (Oxford University Press, 2014).

Lidia Zielińska – a professor of composition and the director of the Electroacoustic Music Studio at the Music Academy in Poznań, she also ran the sound reception workshop at the Academy of Fine Arts in Poznań (1989-2010). She graduated from composition studies at the Musical University in Poznań, under the supervision of Andrzej Koszewski. She is the prize winner of many international prizes at composition contests. Works of Zielinska have been performed on music festivals in several countries of Europe, Asia and both Americas. In 2007 she was honoured with the Polish Composers’ Union Award for Outstanding Compositional Achievements. After the political change of 1989, she initiated as a co-founder the establishment of the BREVIS Music Publishers (1990), the ‘Child and Sound’ Foundation (1991), the music quarterly *Monochord* magazine (1993), the Friends of “Warsaw Autumn” Foundation (1998), Wielkopolska Association of Fine Arts „Zachęta” (2004), the PSeME – Polish Society for Electroacoustic Music (2005) and many others.

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This book is a collection of texts dedicated to the changes taking place in many areas of Polish art of the past few decades under the impact of technological tools. It also demonstrates many authors' interests in new scientific research. These transformations are taking place very fast and are present in all forms of art, such as in literature, music and the visual, performance arts. Importantly, however, and this follows from the studies that were carried out when we were preparing these texts for publication, new artistic practices emerge which to a great extent transcend classical definitions of art and its disciplines. These are often activities taking place at the intersection of artistic and scholarly competences which take up major problems today's human beings, faced with technological and cultural processes, have to deal with. In most cases the texts published in this book are penned by theoreticians and practitioners, i.e. those culture scholars whose own practice within the different domains of culture is the foundation of scholarship. Another group are artist-scholars who deliberately apply scientific theories not only to inspire, but also to inform about their projects. The texts, then, are a record of the scientific and artistic experience of their authors who are involved in the dissemination of a new comprehension of the relations between culture, science and technology and of those who see the need for bridging the gaps in scholarship on contemporary art.

Agnieszka Jelewska
(from *Introduction*)

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