

art@science

About Relations between Art and Science

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The art@science phenomenon, which I have included in the title of this text, implies in its structure something more than just artistic and scientific factors operating together. The @ symbol linking both sides highlights that in the newest practices which combine art and science the digital and media technologies play a very important role. Needless to say, it derives from the enormous importance of these technologies in the contemporary world. We find them in various forms in all the artistic domains; also contemporary science widely uses them. The digital technologies literally join artistic and scientific practices together. In the described environment they represent the technical and engineering world. After all three areas of social practices are first put together, the phenomenon described here may fully emerge.

Thinking about the nature of relations between art and science and about their consequences, we may list three types of such relations. I determine them with the following formulae: science for art, art for reality shaped by science, art for science. I will further elaborate on the three types of relations, referring to pieces of art typical for each of them. I wish to underline here that partial characteristics for each type of relations are contained in each other in a defined order: characteristics of the first type may be contained in two others, while characteristics of the second type may be detected in the third one. Their most significant differentiating factors are not specific characteristics but consequences of their joint presence.

Science for art

This is the most popular type of relations in the world of contemporary artistic practices. In its framework, we can find numerous and diverse forms of images of scientific nature and source (astronomical, microscopic, X-ray, USG, tomography images, etc.), sounds audible only due to complicated research tools, structures which take their shapes and operational patterns from research and development activities and works, equipment from research laboratories which constitutes hardware or dispositive in complex installation works. As a result, the created works refer to a new type of aesthetics, where features characteristic for creations from the world of science and engineering play a role as an aesthetic value and their previous aesthetic attributes receive new expression. The works that fall into this category await a different type of response from the audience, more comprehensive competencies, and a different type of sensitivity. Among numerous examples of works which belong to this category I will list here only a few: the robotic-choreographic environment *Autopoiesis* (2000) by Ken Rinaldo, *Hysterical Machines* (2006) by Bill Vorn, the zoological-robotic performance *Devolution* by Louis-Philippe Demers and Garry Stewart (2006), the robotic kinetic sculpture *Black Widow 1* (2008) by Christopher Conte, the artistic-research workshop *Vivoarts* (2010) by Adam Zaretsky and the 2010 animatronic sound sculpture *Hippy Dialectics* by Nathaniel Mellor.

I would like to elaborate on one example of this type of relations between art and science. *C DNA* (2009) by Brian Shucker is self-replicating computer software, whose visualisation on the computer screen takes the shape of an image of alpha-helix. At each start-up of the software, it generates this image with a code written on it. Running the code in that image produces a copy, which generates another copy and so on – till eternity. This process corresponds to the DNA self-replicating process in nature. The processual structure of the work of art takes its parameters from biology and molecular genetics.

The above described type of art and science relation I define with the formula *science for art* because as a result only art receives new qualities, new shapes, proposes new fields of meanings which are negotiated by the audience. The sphere of science is in this case a

source, promoter or context of artistic transformations, without being subject to transformation itself at the same time. At most, one can argue that in consequence of the processes science may change its social role and position. But this change is rather an indicator of the next type of art and science relations.

Art for reality (shaped by science)

In this type of relations art has a very specific adaptation function – it introduces you to a reality in which a gradually growing number of determinants is shaped by science. Images, forms or event structures are more than pure creations of scientific procedures, used in artistic work and setting new aesthetic orders. The individual pieces created under this type of art and science relations set up environments whose experience exceeds the reference to the previous aesthetic framework and they become a form of learning a new order of existence. In his book published in 1925, *Painting, Photography, Film*, Laszlo Moholy-Nagy proposes perceiving works of photography and film as an introduction to reality, where the dynamics are determined by the rhythm of growing industrial civilisation¹. Pieces falling into this category introduce us to the world, where the borders between the natural and the cultural are fuzzy, like the border between the present existence and created existence, and they introduce us to a hybrid world where the rules are defined by contemporary science: by genetics, IT sciences, robotics. It is not however about mere popularisation of sciences and the research results, but about creating artistic phenomena, where aesthetic experience connects and merges with cognitive experience. Works created within this stream tame us with the previously unknown phenomenon and provoke us to reflect on the new order in our reality.

Telematic Dreaming (1992) by Paul Sermon, *Can you see me now?* (2001) by the Blast Theory group, *Cell Tango* (2006-10) by George Legrady and Angus Forbes and *levelHead* (2007) by Julian Oliver offer an experience of the world where the reality interpenetrates with the virtuality that creates new forms of presence, contact and activity. The artificial ecosystem *A-Volve* (1993-94) by Christa Sommerer and Laurent Mignonneau (fig. 2), the biotechnological installation *Victimless Leather* (2004) by Oron

¹ Laszlo Moholy-Nagy, *Painting Photography Film*, trans. Janet Seligman. Cambridge, Mass.: MIT Press, 1973

Catts and Ionat Zurr, and the hybrid plant *Edunia* (2003-08) by Eduard Kac introduce us to new dimensions of life. *Zero@wavefunction* (2002) by Victoria Vesna and James Gimzewski reveals the hidden dimensions of nanoexistence. *Eros and Thanatos Falling/Flying* (2006) by Ken Feingold, *Alexitimia* (2008) by Paula Gaetano-Adi and *The Hosts: A Masquerade of Improvising Automatons* (2009) by Wade Marynowsky initiate the experience of various forms of nonhuman, artificial intelligence. All these pieces, apart from numerous, diverse features specific for each of them separately, have one feature in common: they locate themselves in a perspective of a world whose highly important determinants have been designed in research laboratories.

The relations between art and science focus in this case on real world in its actual figure; they construct a reflection framework on the contemporary determinants of existence. Today art not only designs tools to examine and learn about the world we live in, but also creates this world. However, due to the complicated procedures and hermetic language in which it speaks and expresses itself, science remains incomprehensible and inaccessible to most of us. Art pieces that belong to this category are useful to understand new dimensions of existence and – however indirectly – help science to reach those for whom it is inaccessible to become part of their world. In this indirect way, art works here again for science sake. It is another category where art serves science in an indirect way.

Art for science

In the last of the discussed types of relations between art and science, art acts for science. It does so by producing knowledge or creating new contexts and inspirations for it. Artists get gradually more often involved in some very complex, multidimensional projects, and their works or the events they have organised exceed and remove borders, which used to divide art from other spheres of social activities. The contemporary artistic practices merge here with many different forms of activities: ecology, politics, and community projects. Their works also become subject to theories, and they evolve into research and cognitive discourse.

In the initial development phase of this category, the artistic cognitive discourses took the form of a meta-artistic reflection. The subject of cognitive, theoretic consideration was art itself and its various aspects and factors. This attitude was very distinctive in the field of conceptual art. The most radical theory within this thinking area seems to be a concept of Edward E. Small, which recognised neo-avant-garde cinema and video art to be a direct theory of film². In Small's concept, in experimental film and video, images take in discursive features and are capable of reflecting on themselves as a field of art, and also on their relations with other phenomena and activities. The direct theory advocated by Small has the status of theoretically directed film and video practice. Small perceives it as an activity that makes itself the subject of its own cognitive interest, a creation that gives privilege to the cognitive aspect over the artistic one³. Numerous examples of this approach we can find in the *oeuvre* of such artists as Stephen Beck, Voytek Brzuszewski, Peter Campus, Woody and Steina Vasulka, Bill Viola.

In its further history, the tendency to identify artistic discourse with a meta-artistic one, focusing on the cognitive function, has enhanced the scope of interest and went beyond the territory of art. In this view, artistic creation becomes a critical theory of culture. Pieces of art, which are within this concept search for critical strategies of deconstruction or subversion, reveal deep ideological structures, show systems of making or reproducing power or mechanisms of having social control. In any of these cases, art has a primarily cognitive function and has become a form of social-cultural research, a critical theory of culture. Video installation *...from the Transit Bar* (1992) by Vera Frenkel, Zbigniew Libera's *LEGO. Concentration Camp* (1996), *Greetings from Jerozolimskie Avenue* (2002) by Joanna Rajkowska, and Mieke Bal's video installation *Nothing is Missing* (2006-2010) may serve as examples.

In its most radical phase of development, the art cognitization trend directs art toward science. At present, art has a creative dialogue not only with the theory of culture, but also with genetics, physics, biotechnology, research on artificial intelligence and nanoscience. Artists involved in this sort of activities believe that science should not be

² Edward S. Small, *Direct Theory. Experimental Film/Video as Major Genre*, Southern Illinois University Press, Carbondale & Edwardsville 1994.

³ Ryszard W. Kluszczyński, *Metadyskursy w sztuce nowych mediów*, [w:] *Interfejsy sztuki*, red. A. Porczak, ASP, Kraków 2008.

perceived any more as the only area of social practices where knowledge is produced. As a result of this attitude, art takes up new tasks and rejects the traditional division between objective science and subjective art. It aspires to the role of a research environment, a source of valid and valuable knowledge. The relations of this art with science are no longer limited, as they used to be, to popularisation or critical references to the results of scientific research. Art may be and often is an area and a method of research. Many artistic works, most often coming from the field of new media, undertake tasks located between the traditionally perceived artistic creation and scientific and cognitive activities. All these pieces, on the one hand, reactivate the alternative epistemological scientific tradition, which had been rejected in the Enlightenment era, and on the other hand, they transfer the artistic practices to the research laboratories. As a result of this migration we have, among others, artistic tendencies such as bio-art, robo-art, transgenic or nano-technological art. The works deriving from these tendencies combine attributes of both artistic and scientific creations and constitute a new, significant quality in both areas. Good examples of these types of relations may be such works as *Relative Velocity Inscription Device* (2002) by Paul Vanouse (fig. 3), *The Space Garden* (2007) by Zbigniew Oksiuta, *May the Horse Live in Me* (2004-2011) by Art Orienté Objet (Marion Laval-Jeantet and Benoît Mangin), *BBa_K221000: First volume of teenage gene poems* (2009) by ArtScienceBangalore (Yashas Shetty and Mukund Thattai), *Mucilaginous Omniverse* (2010) by Eveliny Domnitch and Dmitry'a Gelfanda, *Cinema for Primates* (2011) by Rachel Mayeri and Sarah Jane Vick.

In conclusion, it is important to mention that the emergence of the latter type of relations between art and science (art for science sake) has been possible also as a result of transformations of science itself. Francesco Casetti, for example, describes this transformation by identifying several stages. He has identified four methods to determine the status of the theory and linked them with concepts formulated by specific researchers. So for Ernest Nagel a scientific theory was a formal system, founded on a definite number of axioms, a well-defined notion framework and strict procedures that defined how to use empirical terms. For Karl Popper the theory was only an assumption, which helped to grasp the meaning or to establish the function of a specific phenomenon. For Thomas Kuhn the theory has a nature institutionally shaped, which is only a point of view accepted among researchers and believed to be effective. At present

however, in the context of Paul Feyerabend's ideas, theory has become nothing more than shared knowledge⁴. Systematic weakening of the scientific theory's definition regime, which contributed to its dispersion, is also connected with contextualisation and relativisation of the research results. All the processes have provided for a beneficial context for scientific aspirations of art enabling it to adopt, under certain conditions, the function of theoretical and cognitive activity.

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⁴ F. Casetti, *Theories of Cinema 1945-1995*, Austin: University of Texas Press 1999, p. 2.