

Contemporary Practices in Bio-art

Contemporary Practices in Bio-art:

*When a Tree Becomes
an Artwork*

By

Lilia Chak

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INTRODUCTION

"Human history can no longer proceed chaotically; rather, it must be harmonized with the laws of the biosphere, from which the human being is *inseparable*. On Earth, humanity and the surrounding animate and inanimate nature constitute a single whole, which exists in accordance with general natural laws."¹

V. Vernadsky

The year 2019 saw the release of two TV series that have made a powerful impression on global audiences: *Our Planet* and *Chernobyl*. The first of these is a documentary, while the second is a historical drama. *Our Planet* draws our attention to the decline of biodiversity of the flora and fauna, which has accelerated tremendously in recent decades all over the world. *Chernobyl* is a recreation of the greatest anthropogenic disaster in human history – the explosion at the Chernobyl Nuclear Power Plant in Ukraine in 1986.

One of the most discussed episodes in *Our Planet* is the scene with the baby flamingo. We watch a flock of flamingo gathering on a salt pan in Africa to breed. By the time the chicks are ready to hatch, the surrounding soil has dried up, forcing the newborns and their parents to leave their haunts in search of water. The nearest water source is about 50 km away. As the birds are wandering across the plain, the salt clings to their feet, crystallizing into heavy saline “shoes”. For this reason, many of the hatchlings are unable to move, and die. Viewers were even more shocked by the episode with the walrus, which had been filmed in Russia. Because of climate change, the ice over much of the walrus’ traditional habitat has melted. As a result, they are stuck in a miserable condition, unable to return to the water. The camera has captured one particular walrus who was trying to jump into the sea from a height of 80 meters. The animal hit numerous rocky outcroppings, but failed to reach the water.

The creators of *Our Planet* have successfully demonstrated the harmful impact of human activity on the health of the planet. The key themes of the documentary series are climate change, the rise of sea levels, deforestation,

¹Вернадский В. *Научная мысль как планетное явление*. — Москва, Наука: Отв. ред. А. Яншин, гл. 1, 1991.

pollution, and war. The creators of *Chernobyl* have drawn parallels with the contemporary ecological and political situation of the world, by modeling a scenario which humanity may have to deal with under conditions of climate change, and by pointing to the inability of the contemporary global powers to deal with this worldwide problem. The depiction of the horrors of the Chernobyl disaster and its irreversible global consequences, like the harsh images of *Our Planet*, have shocked viewers and flooded the social networks. The viewers looked the truth in the eyes, and were shocked.

The unprecedented rates of economic growth and the unbridled desire to consume have brought the world to the brink of ecological catastrophe. Overconsumption has led to environmental pollution on a massive scale, threatening the health and well-being of people the world over. Unlike past centuries, when people tended to associate the future with divine fiat or the decisions of potentates, today our future is in our own hands. Scientists have proved that climate change, which has become a global concern, was caused by the specific actions of large groups of people in various countries. The uncontrolled extermination of animals; the unjustifiable increase in gas emissions; the pollution of the oceans with huge amounts of plastic bags and bottles, and other kinds of toxic, poorly decomposing waste – all this has inevitably affected the ecological health of our planet.

There is almost no time left to deal with these monstrous consequences. Nature is vanishing at a breakneck pace. We are witnessing a global deterioration in the condition of soil, rivers, lakes, seas; the shrinking of woodlands and green areas, and a reduction in the quantity and quality of freshwater resources. This leads to the spread of digestive disorders and infectious diseases of the liver and kidneys. “Acid” rain is another grave hazard to human health. It damages the eyes, causing acute conjunctivitis, and the respiratory system, causing bronchial asthma, coughing, and lung disease. The water in many rivers has become so toxic that it cannot be used even for plant irrigation.

Nowadays, in addition to shortages of potable water, we may also speak of a shortage of ordinary “breathable” air. In many Asian countries, crowds of people wearing face masks have become a common sight. We know that smog is harmful to human health.

Ecologists have long been trying to draw attention to the catastrophic consequences of human industrial activity. The goal of uniting people for the sake of saving the planet has become one of the preoccupations of modernity, leading to the emergence of various organizations that are concerned with ecological problems. Nowadays, it is obvious that the global challenges – such as climate change, environmental pollution, the disappearance of entire ecosystems and their characteristic flora and fauna

– cannot be solved through individual action. One recent term is “climate refugee”. The accelerating pace of climate change leads to increasing numbers of such “climate refugees”. Today, tens of millions of people are forced to leave their native lands. For now, the world is preoccupied with the problem of mass-migration brought about by numerous local wars. Soon, however, we will have to deal with a wave of refugees of a very different sort, which is likely to be even more massive.

This is why there is such a high demand for forecasts of the future of human civilization and for practical measures that can unite the nations in the struggle for survival. The developed democratic societies have come to realize that, in order to achieve tangible results, they will need to create supranational – and possibly even continental – unions. The search for solutions to these ecological problems is one of the crucial challenges facing the international community.

The subject of the study: Bio-art as a new cultural phenomenon and generator of solutions to the ecological problems facing modern society

Nowadays, artists are mastering fairly complex artistic strategies, exploring and exploiting the possibilities of new technologies. We are witnessing the emergence of digital painting, hypertext literature, digital poetry, ASCII graphics, pixel graphics, chiptune (electronic music), the demoscene (video art that is being generated by the computer in real time), etc.

Art has always been at the forefront of the processes that determine the development vector of society. Recently, the “mandate” of art has been greatly expanded. Art is now offering possible solutions to global challenges. As a result of these processes, it has assumed a leading role in the modern world, becoming far more proactive than the art of past ages.

Bio-art developed as a subfield of Science-art, eventually branching off into a separate school. Science-art, which utilizes the achievements of various sciences (mathematics, chemistry, physics, etc.), and Bio-art, which works with the medium of “living” matter and uses the achievements of biotechnology, are painting our future with different “brushes” and on different “canvas”.

The methods of the adherents of these schools are similar in some respects to those of their predecessors, while being very different from them in others. In this study, we shall explore the objectives they pursue, the ideas that inspire them, and the ways in which they implement their projects. We aim mostly at studying the ongoing processes in Bio-art, since it is one of the largest and most important subfields of Science-art. Therefore, we ought to provide the most accurate definitions of these schools of Contemporary art.

There are varying definitions of the terms “Bio-art” and “Science-art”. Having considered the different viewpoints, we are inclined to accept the following definitions, supplied by Olga Levchenko, a scholar of modern Science-art, in her work *Mastering Nature with the Means of Science-Art: The “Natural” and the “Technological”* – the thesis that she submitted at the Department of the History and Theory of Culture of the Russian State University for the Humanities (Moscow) in 2016.

Science-art (scientific art) is a syncretic phenomenon of the culture of the early 20th – early 21st centuries, a subfield of Contemporary art, which conceptualizes scientific problems through artistic-playful means, and which carries out its projects with the aid of scientific-technical and technological inventions that possess an aesthetical, ethical, projective, and entertaining function.²

Science-art is a liminal field existing on the boundary between scientific disciplines (including the natural sciences) and Contemporary art. The majority of experts – art scholars and theoreticians – regard Bio-art as one of the most fruitful approaches to the integration of art and science³, since the 21st Century is predicted to be the age of biology.⁴

Bio-art (biological art) is the totality of practices on the boundary between art and various biological disciplines.⁵

Why have we chosen to focus our study mostly on issues related to Bio-art and to the other schools that have “grown” out of it? Out of all the fields of Contemporary art, Bio-art is the one most concerned with studying the ecological problems of our planet. Members of this school collaborate with scientists (biologists, physicists, and chemists) in research laboratories, shaping the vector of development of biotechnologies.

The major difference between the work of bio-artists and that of artists of bygone ages is the fact that the projects of the former typically result in practical proposals for the solution of contemporary technological problems.

²Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — РГГУ: 2016, с. 4.

³Ерохин, С.; Мигунов, А. *Направления научного искусства. Биоарт*. — Грамота: № 12 (50): в 3-х ч. Ч. I, 2014, сс. 69—78.

⁴Ibid.

⁵Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — РГГУ: 2016, с. 153.

The projects of Bio-art are the result of a new type of thinking, in which art and science do not merely complement each other, but actually constitute a single whole. Furthermore, Bio-art offers a new conception of technology. By turning various projects into peculiar interactive games played with the viewer – frequently involving the use of grotesque and humorous elements – the artists help to defuse tension and fear in the face of cutting-edge technologies, which still seem alien, mysterious, and threatening to most people. The bio-artist thus becomes our guide to the world of science.

The relationship between humanity and nature has changed over time. Nowadays, it is characterized by the expansion of technology into nature. Bio-art conceptualizes these processes through artistic means, appealing to people's consciousness and emotions. The humanist projects of Bio-art seek to strike a balance between the natural and the technological. The contemporary relevance of our study lies in exposing the potential for finding such a balance, which has enormous significance for contemporary human life.

The relevance of the present study stems from the following aspects:

- Bio-art is a new artistic phenomenon, which is the result of the interpenetration and cooperation of science, art, and innovative biotechnologies;
- Bio-art affects the viewers in a particular way, which is different from the ways used by other schools of Contemporary art;
- Bio-art creates a repository of natural problems and shines a spotlight on ecological and environmental challenges;
- Bio-art visualizes the new philosophical ideas of transhumanism, which regard the human being as an integral part of nature;
- Bio-art is being actively developed and shaped before our eyes, and this requires us to make a special effort to capture this process and conceptualize it in art&science terms.

The degree of elaboration of the object of this study:

Bio-art is a relatively recent phenomenon (from the late 1990s to the present day). Bio-artistic works began to be created in the US in the late 1990s, eventually spreading to Europe. Nowadays, Bio-art is being actively developed in North America, Europe, and Australia.

Because of the relative “youth” of Bio-art, there currently exist relatively few in-depth theoretical works dealing with the phenomenon. We have used the writings of authors such as R. Ascott, C. Sommerer, L.

Mignonneau, D. Edwards, J. Zylinska, I. Reichle, N. Lyons, D. Bulatov, B. Groys, S. Erokhin, D. Galkin, O. Levchenko, and others.

Their thoughts and ideas have helped us create a multidimensional picture of the processes taking place in Bio-art. We are interested in the following questions: Who is the addressee of bio-artistic works? What is the role assigned to them by their creators in social life? How do these creators envision the solutions to the ethical problems that repeatedly confront the artists working in the field of Bio-art?

We should note that many contemporary artists are also prominent scientists and university professors. This, too, is a phenomenon that we intend to explore here. An example of such a “creator of our time” is Roy Ascott, an artist and scholar who was Professor for Communications Theory at the University of Applied Arts, Vienna, during the 1980s, and Professor of Technoetic Arts at the University of Wales, Newport, in the 1990s. R. Ascott has achieved international renown in the field of media art. Ars Electronica, the largest European festival of technological art, honored him as a “visionary pioneer” in 2014, awarding him the Prix Ars Electronica. In his capacity as a scholar, Ascott analyzes the impact of Contemporary art on the human being, concluding that this impact cannot be overstated. In his theoretical essays “Art and Telematics: Towards a Network Consciousness”⁶ (1984) and “Is There Love in the Telematic Embrace?”⁷ (1990), he asserts that telematic art opens the path to an expanded planetary consciousness, which is much more powerful than the sum of its parts.⁸

Since the school of Bio-art is still being formed, we constantly run into terminological problems when trying to describe this phenomenon. We have had ample opportunity to witness the conceptual confusion in this field. The question of the terminology used in Science-art has been taken up by the scholar Ingeborg Reichle. We are inclined to agree with the definitions she gives to the various processes observed in the field of Bio-art.⁹

Her thesis regarding the reasons for the separation between the arts and the sciences is rooted in an analysis of the respective positions of the arts and the sciences from the Age of Enlightenment to the 19th Century.

⁶Ascott, R. “Art and Telematics: towards a network consciousness” // *Art + Telecommunication*. — Vancouver, 1984, pp. 25—67.

⁷Ascott, R. “Is There Love in the Telematic Embrace?” // *Art Journal*. — New York, 1990, pp. 241—247.

⁸Shanken, E. *Art and Electronic Media*, p. 34.

⁹Reichle, I. *Art in the Age of Technoscience: Genetic Engineering, Robotics, and Artificial Life in Contemporary Art*. — Wien: Springer-Verlag, 2009, p. 213.

“Science began to base itself on the ideals of neutrality and objectivity, and art increasingly expressed itself in ways that invoked subjectivity and artistic genius. The claim of being objective led to a changed self-conception in the natural sciences, because the precision of their methods appeared to guarantee the reliability and correctness of all findings. This also led to the rapprochement of disciplines that had formerly been separate, such as physics and mathematics. The avantgarde art movements of the twentieth century merely registered the existence of science: it had become an alien cultural domain for them and they saw no possibility to overcome this. Moreover, art was condemned to an endless cycle of self-referentiality.”¹⁰

We agree with Reichle’s claim that the practices existing on the edge of art, science, and technology are preparing us for the new future. We concur with the statement that

“<...> Bridges will not only be built <...> between science and art, but also between science and its technologies and our everyday life so that we are better prepared for the emergence of a biocybernetic humanity.”¹¹

“The mutual exchange between the two areas of culture, and the ‘mutual benefit’ derived by the representatives of both fields, are noted by all those who try to analyze the art&science practices.”¹²

“Artistic strategies thus become instruments for achieving insights and knowledge, and scientific procedures and methods become media for artistic expression.”¹³

Joanna Zylińska, Professor of New Media and Communications at Goldsmiths College of the University of London, is an author, artist, and curator. She has authored the books *Minimal Ethics for the Anthropocene* (Open Humanities Press, 2014), *Life after New Media: Mediation as a Vital Process* (MIT Press, 2012; co-authored with Sarah Kember), and *Bioethics in the Age of New Media* (MIT Press, 2009). The questions that she raises in her studies are relevant to many art&science projects – e.g., is it ethical

¹⁰Ibid.

¹¹Reichle, I. *Art in the Age of Technoscience: Genetic Engineering, Robotics, and Artificial Life in Contemporary Art*. — Wien: Springer-Verlag, 2009, p. 216.

¹²Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — ПИГУ: 2016, с. 119.

¹³Reichle, I. *Art in the Age of Technoscience: Genetic Engineering, Robotics, and Artificial Life in Contemporary Art*. — Wien: Springer-Verlag, 2009, p. 216.

to transplant kidneys or genes from one animal species to another? What about transplanting animal organs into human beings?¹⁴

Zylinska draws a distinction between morality and moralism,¹⁵ thinking that, all too often, when trying to evaluate the works of Bio-art and the actions of its practitioners, some members of the audience succumb to outright moralism, whereas the artist should obey certain moral rules, while remaining relatively free. Zylinska notes that

“<...> the introduction of the challenges and side effects of revolutionary scientific and technological concepts into the public space is the true vocation of the artist.”¹⁶

Zylinska's view of traditional ethics seems remarkable to us: she asserts that people have both rights and obligations *vis-à-vis* their habitat. Her studies raise the question of whether we can come to know ourselves from a different angle in order to redefine our purpose in this world, and they determine a novel conception of bioethics.

This scientist notes that, while regarding life as a self-evident value, we cannot ignore the peculiar web of duties imposed on us by the mere fact of us having come into this world. How can we avoid succumbing to panic on the issue of new technologies, and feel no anxiety about their potential to destroy humanity? How do we stop feeling infantile excitement at the sight of innovations? For the purposes of our study, it is important that Zylinska is trying to redraw the boundaries of the human relationship with modern technology.

J. Zylinska thinks that modern society is still not ready to solve the ethical challenges stemming from the use of new technologies. We share her view, which emphasizes the need to educate, discuss the controversial issues, and create a forum for people to express their opinions, listen to others, ponder the relevant issues, and draw conclusions. For her, art is the very instrument that creates the possibility of discourse.

As an example, she brings up an interesting project carried out by the American artists Julia Reodica and Adam Zaretsky as part of the *Unmediated Vision* exhibition (curated by Stacy Switzer at the Salina Art Center in Salina, Kansas, in 2002). The project was sponsored by the The

¹⁴Зилинска, Ю. *Биоэтика в эпоху новых медиа*. Лекция в рамках Polytech.Science.Art Week от 09.12.2015. [Electronic resource]. — URL: https://www.youtube.com/watch?v=4DnQ3_aaqBs — (retrieved on: 09/15/2019).

¹⁵Ibid.

¹⁶Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — РГГУ: 2016, с. 128.

Daniel Langlois Foundation for Art, Science and Technology. The performance was called *Workhorse Zoo*. The artists put different animals in a single cage, and then A. Zaretsky, dressed like a caveman, spent a week in this improvised laboratory. On the last day, he killed the animals, and then cooked and ate them. Afterward, he conducted a series of surveys on ethical questions among the audience, inquiring as to why they were so upset, whether they regarded this performance as art, and whether they understood what this project was about.

We share Zylinska' view, according to which, in this case, the artistic act serves as a provocation, which refrains from giving definite answers to the audience. Nevertheless, it expresses a point of view that can be used as a springboard for the search for one's own conclusions. Zylinska makes the following conclusion: We all need to learn how to live in a new world that accommodates different opinions. The obvious philosophical subtext catalyzes the viewers' imagination, making them ponder our relationship with the world.

* * *

The **object** of this study is Bio-art as a new school of Contemporary art and a cultural phenomenon that unites the spheres of science, art, and technology; we aim to investigate the methods and goals of Bio-art.

To this end, we have selected some artistic works that aim primarily at an active engagement with the natural world and the natural legacy.

“Penetrating into the mysteries of nature, playing with the boundaries and the essence of the ‘natural’, involving the viewer in the process of observation/intervention in the ‘natural’ through the ‘scientific’ and the ‘technological’”¹⁷

– all these techniques are part of the repertoire of the bio-artistic projects that we have examined. The bio-artists

“<...> reveal new aspects of the ‘natural’ to the viewers through the prism of science and technology, since contemporary nature is, to a large extent, the result of its being mastered by humanity.”¹⁸

The chronological boundaries of the study (the late 20th – early 21st centuries) have been determined by the relatively recent emergence of the

¹⁷Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — ПИГУ: 2016, с. 12.

¹⁸Ibid.

cultural phenomenon being analyzed. Of course, the works of E. Steichen and G. Gessert – the founders of Bio-art – were created much earlier. However, in those days, Bio-art as a whole had yet to crystallize into an independent movement. The term “Bio-art” would not enter the international vocabulary until much later.

The major sources of the study:

- Archival materials of museums, galleries (the London-based Arts Catalyst, the Berlin-based Art Laboratory Berlin, the SciArt Center in New York, etc.), and festivals of scientific and technological art (Ars Electronica in Linz, Transmediale in Berlin, FAST in Cambridge, Massachusetts, etc.);
- Exhibition materials;
- Monographs, collections, articles, and albums that are dedicated to collaborations between the representatives of art, science, and technology;
- Thematic lectures;
- Personal communication with artists, scholars, and curators of exhibitions in the field of Bio-art;
- Interviews with theoreticians and practitioners of Bio-art.

The objectives of the study:

The claim that Bio-art is not just a novel cultural phenomenon, but also a source of solutions to the technological problems facing humanity, has shaped the general goals of this study. We have set out to determine the ideas that inspire bio-artists to create their works. Which philosophical ideas and cutting-edge scientific discoveries currently “animate” the artists, “demanding” to be realized? What are the peculiar features of Bio-art and the prospects for its future development?

To achieve this goal, we need to, on the one hand, determine the sources and essence of this school – or, rather, the precise elements of continuity and innovation that define its relationship to other artistic schools that explore nature. On the other hand, by observing the “fixation” of Bio-art on solving ecological problems, we wish to study the methods it uses to achieve this goal, and the specific suggestions it makes when it comes to dealing with climate change, the extinction of flora and fauna, the pollution of the world’s oceans, and the desertification of large swathes of land.

We have decided to focus mostly on art&science projects that emphasize the concept of the “tree” both as a symbol and philosophical concept, and

as a source of oxygen and clean air (and, ergo, the most crucial form of life on Earth, which enables the existence of all other life forms). To this end, we will examine the latest scientific achievements in the study of the plant world in general, and trees in particular.

Given the diversity of forms, types, and subjects of Bio-art, we intend to delimit the major artistic and technical expressive means used in the creation of bio-artistic works, taking into account the present-day interpenetration of the natural and the technological.

This study repeatedly uses the terms “natural” and “technological”. We define as “natural” that which

“is related to nature (flora and fauna), natural phenomena (sunlight, precipitation), and the biological components of projects (plants, animals, cells, etc.). Conversely, we define the ‘technological’ as that which is related to modern technology (computer software, wetware), technical devices (the equipment used in the creation and operation of bio-artistic objects), and the scientific apparatus.”¹⁹

Our goal will be achieved by accomplishing the following tasks:

- Studying the interaction between science and art as two ways of learning about reality that shape people’s worldviews, two ways of influencing human consciousness, and two forms of human intellectual and artistic expression at different stages in the history of culture;
- Studying the works of Bio-art as a new artistic school that “combines” science, technique, and technology, and defining their developmental trajectory;
- Describing the interpretation of the image of the “tree” by artists of past epochs, and capturing the various depictions of nature (including trees) in a historical retrospective;
- Defining the manifestations and goals of incorporating various cultural phenomena and religious meanings in bio-artistic works, including those dedicated to the subject of trees;
- Defining the peculiarities and distinguishing features of bio-artistic works dedicated to the subject of the “tree”, and coming up with the appropriate terminology for this new subfield of Bio-art, which includes the concept of “Dendro-art”;

¹⁹Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — РГГУ: 2016, с. 14.

- Analyzing the most ambitious and influential projects of the Art & Science Laboratory of the Sorbonne headed by O. Kisseleva, which illuminate the concepts of “tree” and “forest” through various artistic methods and devices;
- Conceptualizing the range of concerns taken up by Dendro-art as a new artistic school that has emerged out of Bio-art;
- Carrying out the extensive curatorial project of the art&science exhibition titled “Listening to Trees Across the Jordan River”, which is dedicated to the ecological challenges of the modern world.

In light of the tasks set out above, this study has assumed a particular structural form, enabling the fullest development of its subject matter, goals, and general content.

The scientific novelty and theoretical significance of this study:

A cultural phenomenon such as Bio-art can be approached from different angles. In the present study, this school of Contemporary art will be examined from a philosophical point of view, and in a historical perspective. The study will be fleshed out by an art-historical and culturological approach.

The innovative quality of this work lies in the fact that many aspects of the phenomenon of Bio-art will be looked at from a new angle: the author of the present study is herself an artist who has received academic training in the field. Therefore, she will be able to examine the works of bio-artists both from the “inside” and the “outside”. As a former “classical” artist, she can grasp and understand the factors that cause artists to turn to Contemporary art, and later to Bio-art. Remarkably, the reasons that led the artists examined in this project to engage with Bio-art have turned out to be similar to the ones that attracted the study author to this field.

The fact that the study author is an artist has enabled her to approach the works of bio-artists from an artistic point of view, noticing things that often remain hidden from the eyes of scholars with a different background. The Art & Science Laboratory of the Sorbonne is a unique institution, with no counterpart in any other university.

Its existence has given the author of this study the unique opportunity to embody the “triple alliance” of art, science, and technology. The study will seriously examine the theoretical questions of science and art, whose results will be embodied in an extensive practical project: the exhibition titled “Listening to Trees Across the Jordan River”. It will exemplify a new approach to studying the theory and praxis of Contemporary art.

We must note that the subject of the “tree”, which is being increasingly explored by contemporary bio-artists, is the natural culmination of the entire history of Bio-art, from the projects of E. Steichen, G. Gessert, and E. Kac, down to the works of O. Kisseleva. O. Kisseleva’s projects in the field of Bio-art, which began in 2009 and are still ongoing, have yet to receive an adequate scholarly treatment. We are processing the materials sent to us by O. Kisseleva, including exhibition catalogues, photographs, articles, and information published online. We have always been deeply interested in the achievements of modern science. As part of our professional activity, we have frequently had to engage with scientific studies. We will have to appeal to interdisciplinary knowledge, consulting both culturological and art-historical sources, as well as scientific works. For instance, Chapter 2 will provide an extensive classification of the types of sensors that monitor the condition of trees.

One of the major conclusions of the study is the emergence of the new artistic school of “Dendro-art” in our time. This school encompasses those projects by O. Kisseleva that deal with trees. We will lay out the major features of this movement and offer a scholarly definition thereof.

The methodology of the studying:

The methodology of this study is based on the conception of Bio-art as an art form belonging to the age of postmodernism. Its emergence stems from the development of the typological traits of an information society in the late 20th Century. Space travel, the immersion in a virtual world, and the alienation from nature have become the signs of our time. The investigation of previously unknown layers of life has led people to doubt the anthropocentric culturological paradigm, which regards the human being as the “pinnacle of creation”. All these issues have been reflected in the works of bio-artists.

Despite being an outgrowth of postmodern culture, Bio-art is in conflict with some of its tenets. In our opinion, it is closer to the emergent paradigm of metamodernism,²⁰

“<...> which is characterized by the transcendence of postmodernist irony and the emergence of a new romanticism”²¹

²⁰Vermeulen, T., Akker, R. van den. “Notes on metamodernism” / T. Vermeulen, R. van den Akker // *Journal of Aesthetics and Culture*. Vol. 2, 2010.

²¹Левченко, О. *Освоение природы средствами сайнс-арта: «естественное» и «технологическое»*. — ПГТУ: 2016, сс. 15—16.

and by

“<...> a different level of integration of the disparate elements of culture, in contrast to the fragmentation of postmodern culture.”²²

Walter Benjamin’s theory²³ regarding the function of the artwork in the age of its mass reproduction is one of the key contributions to the discussion of 20th-century art. Is Bio-art related in any way to this discourse, which focuses on technologies of replication? Bio-art exists in the “here and now”. Its works are born, live, and die before the eyes of the audience. Many bio-artistic works, like classical watercolor paintings, are created *alla prima*. Bio-art is not based on Jean Baudrillard’s concept of the *simulacrum*,²⁴ which presupposes the representation of something non-existent. The projects of Bio-art are truthful in the same way that nature is “truthful”.

The works of bio-artists surprise us chiefly by expanding our consciousness. By implicating the viewers in their game, the bio-artists make their works interactive, yet there is nothing mechanistic or “faddish” about this interactivity. Rather, the interactivity of Bio-art stems from the desire to speak to the viewer as an “equal”.

The concept of the “rhizome”, which has been introduced by G. Deleuze and F. Guattari,²⁵ creates a philosophical and culturological model that is attractive and easy to visualize. The complexity and profundity of many bio-artistic works is nicely encapsulated by this philosophical and poetical metaphor.

Today, bio-artists are increasingly adopting J. F. Lyotard’s idea²⁶ that not everything can be grasped by science. This idea fits nicely into the metamodernist²⁷ paradigm. As adherents of Science-art, bio-artists make frequent use of folk beliefs, ancient knowledge, legends, and mythology. The realization, shared by many artists, that the world conceals many things

²²Ibid.

²³Беньямин, В. *Учение о подобии: Медиаэстетические произведения*, РГГУ, 2012.

²⁴Бодрийяр, Ж. *Симулякры и симуляции*. — М.: ИД «Постум», 2015.

²⁵Делёз, Ж.; Гваттари, Ф. *Ризома // Философия эпохи постмодерна*. — Минск, 1996.

²⁶Лиотар, Ж.-Ф. *Состояние постмодерна*. — СПб.: Алетейя, 2013.

²⁷Metamodernism is a term that describes the changes and condition of culture from the 1990s to the present day. This term, which is meant to replace the notion of postmodernism, was coined by the Dutch philosopher Robin van den Akker and the Norwegian media theoretician Timotheus Vermeulen in their essay “Notes on Metamodernism”, which was published in 2010 in the *Journal of Aesthetics & Culture*.

that may NEVER be grasped by the human mind endows the figure of the bio-artist with a certain “humility”. Some thinkers, such as Michel Foucault,²⁸ claim that one of the errors of an anthropocentric philosophical view is its emphasis on the present moment, the glorification thereof, which negatively affects the future. The thinking of most bio-artists is free of such glorification. In the words of M. Epstein,

“<...> the pathos of postmodernism is, in reality, total pluralism, the dictatorship of minorities, difference for its own sake; postmodernism itself serves as an all-encompassing system of sorts, codifying this multiplicity.”²⁹

“Postmodernism <...> is trying to halt the flow of historical time and build a kind of post-historical space; a time after time, in which all discursive practices, styles, and strategies will find an echo, an imitative gesture, becoming involved in an endless game of sign recoding.”³⁰

– this is the definition of postmodern philosophy given by M. Epstein, who speaks of the syncretic nature of this phenomenon. Many bio-artists are just as likely to base their works on the texts of the Torah, the Bible, and the Koran, as on the hard sciences.

The opening line of Shakespeare’s 11th sonnet,

“As fast as thou shalt wane, so fast thou grow’st”,

reminds us of the fragility of our existence. The bio-artists’ invocation of nature – that same nature that is rapidly slipping away – has the ring of a “final farewell”. However, the “past” knowledge is trying to help us in our unknown “future”. The “artist – tree” interaction has ceased to be the artist’s monologue, turning into a full-fledged dialogue between the artist and the tree.

“Everything passes. This, too, shall pass...”

– the words engraved upon King Solomon’s ring reflect the worldview of the modern, “wiser” humanity.

²⁸Фуко, М. *Слова и вещи*. Археология гуманитарных наук. — СПб.: А-сэд, 1994.

²⁹Эпштейн, М. *Постмодерн в России: Литература и теория*. Москва; изд. Р. Элинина, 2000, сс. 54—75.

³⁰Ibid.

The structure of the study:

This study, which is titled “Bio-art: When a Tree Becomes an Artwork, Contemporary Practices” consists of an introduction, three chapters, a conclusion, appendices, a glossary of terms, a bibliography, a list of illustrations, and an index of the names of artists and authors (scientists).

* * *

Chapter 1, “Bio-art: the Artists and the Scientists” *is historical-theoretical in nature, consisting of two parts that explore the ways in which contemporary artists collaborate with scientists. The first section, “The major schools of Bio-Art”, will explore the history of the emergence of Bio-art and its major subfields; the second section, “The tree as an artwork”, will examine the art&science projects that are devoted to trees.*

The first section of this chapter will include a detailed analysis of various genres of art and architecture. We shall briefly look at the “interdisciplinary” artistic-engineering works of Leonardo da Vinci, the universally acclaimed genius of the Renaissance, and Brunelleschi’s dome, which is an example of the synthesis of architecture, painting, drawing, and sculpture. We will also look at the “light music” works composed by A. Scriabin, which synthesize music and technology by creating light and color effects. We will describe one of the artistic principles of the contemporary poet A. Altshuler, whose works combine poetical methods with the “hard” sciences, such as math and physics. In this part of the study, we intend to use rare and unpublished materials provided by the author’s widow.

When studying Bio-art, we witness the emergence of a new phenomenon in modern culture; therefore, it behooves us to record the thoughts and ideas of the individuals who are shaping it. At a certain point in the 2000s, Contemporary art scholars began to describe and analyze bio-artistic works. Nevertheless, it was the bio-artists themselves who offered some of the earliest analyses of their own work. This paradox can be explained by the fact noted above: the bio-artists themselves are scholars and scientists. Many of them have advanced degrees (including PhDs) in the “hard” sciences. They hold professorial posts at prestigious universities and publish articles in authoritative scientific journals. They are interested in various fields of philosophy, poetry, literature, music, as well as in biology, physics, chemistry, ecology, and sociology.

While writing this study, we were exposed to the articles by Edward Steichen, the founder of Bio-art, which had been published in the journal *Camera Work*. In them, he devoted much attention to the discussion of

“<...> getting close to nature in order to convince oneself of its reality <...>,”³¹

which was taking place in the mid-20th Century. We have also been much impressed by the scientific works of another “pillar” of Bio-art, the artist and theoretician G. Gessert. In his book *Why I Breed Plants, Signs of Life: Bio Art and Beyond*, he writes that, in the mid 1980s, he

“<...> began to study hybridization as an extension of painting <...>.”³²

This remarkable similarity between the artistic programs of the two originators of Bio-art, who lived in different historical periods, confirms the enduring relevance of Steichen’s ideas. The biographies of the two have much in common, and this is no accident. The engagement of classical artists with Bio-art comes quite naturally to individuals who, in addition to art, are deeply interested in literature, poetry, and art history, as well as scientific disciplines such as zoology, botany, and plant breeding. Their biographies nicely illustrate this process, reflecting the tendency of many painters, photographers, and video artists to engage in Bio-art.

Another artist who has greatly influenced the development of Bio-art is E. Kac. We intend to make a detailed study of the artist’s personal website and familiarize ourselves with his ambitious projects and scientific studies. Serving as Professor of Art and Technology Studies at the School of the Art Institute of Chicago, he is an outstanding example of an artist who initiates interdisciplinary projects.

The artist ORLAN is a professor at the École Nationale Supérieure d’Arts de Paris-Cergy (ENSAPC). She, too, is a pioneer of Bio-art. ORLAN’s works will be examined in this study.

The artists-scientists of the SymbioticA group – Prof. O. Catts, Prof. I. Zurr, G. Ben-Ary – carry out bio-artistic projects that are stunning in their subtlety and depth of their goals.

In the same chapter, we will look at the ways in which Bio-artists deal with the ethical issues that arise out of the use of modern technologies. It is the Bio-artists who spearhead the processes of using biotechnologies, often testing the impact of these technologies on themselves. The history of science, too, furnishes many examples of professional self-sacrifice. These fearless scientists – Barry Marshall, who infected himself with the

³¹Official website of Filosofia. Bulatov, D. Свое чужое. [Electronic resource]. — URL: <http://filosofia.ru/70510> — (retrieved on: 02/16/2017).

³²Gessert, G. *Why I Breed Plants, Signs of Life: Bio Art and Beyond*. Cambridge — L.: The MIT Press, 2009, pp. 185—197.

Helicobacter pylori bacterium to prove that it causes gastric ulcers; Werner Forssman, who inserted a catheter into his own heart to test a method deemed too dangerous by the medical establishment; Henry Head, who cut his own nerves to see how they worked – have paved the way to saving many human lives.

In the section titled “From Land-art to Eco-art”, we shall examine the artists’ attitude to questions of ecology and environmental protection. Eco-art, which has grown out of Bio-art, will be represented by the works of the French artist Nicholas Floc’h, whose projects aim to create “artificial reefs” to preserve submarine biodiversity.

In the second part of Chapter 1, we will examine the projects of bio-artists who have dedicated their works to the problems of the interrelationship of humans and plants – and trees in particular. These artists touch on the global contemporary problem of the shrinking of our planet’s forest cover. How does this threaten the existence of humanity? Deforestation causes both local and global climate change, in the following ways:

- It exacerbates global warming, and is one of the major contributors to the greenhouse effect;
- It has a negative effect on waterpower engineering and irrigation agriculture, worsening the hydrological regime of rivers;
- It reduces soil adhesion, which can lead to soil erosion, enlargement of ravines, floods, and landslides, reducing the value of agricultural lands that could be suitable for human cultivation;
- It reduces biodiversity (warm tropical forests are the richest ecosystems on the planet, being home to up to 80% of all known species).³³

The need to save the woodland areas – the major sources of oxygen on our planet – looms large in the consciousness of bio-artists. **Works on the subjects of “tree” and “forest” are growing in number. Today, we can witness the emergence of a new subfield of Bio-art, which we will term “Dendro-art”.** The terms “Dendro-art” and “dendro-artist” reflect the birth and crystallization of a new school of Bio-art, which is taking shape before our eyes. Like Eco-art, Dendro-art is exploring the possibilities of saving, reviving, and recreating extinct plant and animal species, as well as landscapes. However, it goes even beyond that.

³³Geist H.; Lambin E. “Proximate Causes and Underlying Driving Forces of Tropical Deforestation.” *BioScience* 52:2, 2002, pp. 143—150.

Based on the results of the latest scientific discoveries – which indicate that trees are complex living creatures, capable of receiving signals, struggling, communicating, memorizing, learning, and having a social life – bio-artists have taken it upon themselves to engage in communication with the plant world, treating it as an equal. Inspired by the ideas of contemporary philosophers, who think that we ought to strive for symbiosis between humanity and nature, the bio-artists wish to let the trees “speak for themselves”, turning them from passive objects into active subjects in their works. To this end, they use cutting-edge biotechnologies. Let us now define this latest school of Bio-art:

Dendro-art *is a school within Contemporary Bio-art, an art&science practice that constructs a new relationship between humanity and the plant world in general – and trees in particular. This relationship is framed as a partnership; it is based on the philosophical and scientific conception of “living systems”, and it shapes a new ecological consciousness.*

* * *

In **Chapter 2, “Ethic – Durable – Ecology – Nature. Studies in the field of Bio-art at the Sorbonne under the direction of Olga Kisseleva”**, we shall examine the tree-related projects carried out under the direction of Prof. Olga Kisseleva. We will pay particular attention to their dynamic; their artistic, scientific, and social value, and their contribution to the history of art.

Nowadays, the Art & Science Laboratory of Sorbonne University, which is directed by O. Kisseleva, is at the forefront of the global praxis of the scientific/ artistic investigation of trees.

We shall examine a selection of dendro-artistic works created at the Art & Science Laboratory under her direction, dividing them into three separate categories. The first category will be termed “artists working with plants at the DNA level”; the second will be called “artists studying the relationships within the chain ‘plant – human being – modern technologies’”; the third will be “artists creating a new kind of relationship with the plant as a dialogue between equals.” The art&science projects of Sorbonne University, which are grouped under the single heading of “Ethic – Durable – Ecology – Nature” (“EDEN”), belong to all three categories, and that makes this artistic phenomenon invaluable for the study of Bio-art, Eco-art, and Dendro-art in particular. O. Kisseleva’s projects have defined the major

trends within each of these categories, exerting enormous influence on the practitioners of this field of art.

This chapter will examine, analyze, and systematize O. Kisseleva's projects from the "Ethical – Durable – Ecology – Nature" series, assessing their contribution to Bio-art, Eco-art, and Dendro-art – and to the history of art in general.

We have classified the numerous projects carried out by the artist based on their subject matter:

- *The theme of the tree as a symbol of the posthumanist worldview* is represented by the "Glee" project, which reflects the postmodern understanding of nature as a source of symbiotic coexistence, which is characterized by mutuality and "respect". As an advocate of the idea of reconciling humanity to its own natural, primordial identity, O. Kisseleva calls upon us to understand and appreciate the legacy bequeathed to us by nature.
- *The theme of saving endangered species* is represented in the "Biopresence" project, which was carried out at the request of the municipality of Biscarrosse, a small resort town in the south of France. We examine how the artist has managed to fully restore the town's lost symbol – an ancient tree that died because of a fungal infection. We will also analyze the innovative technologies that were used to this end, and determine the potential of the biotechnology developed by the artist to create elms with fungal resistance in other regions of southern France, and then elsewhere in Europe.
- The "(h)être le temps" ("Being Time") project, which we have also assigned to this category, aims to recreate nature and lost landscapes, including the European forests. We intended to examine the way in which such a "science-heavy" project has naturally managed to incorporate elements of dance – an art form that seems, at first glance, to be far removed from Dendro-art. This phenomenon expands the Dendro-art "toolkit", enriching its works with music and performances.
- *The theme of fighting against total change in the plants' traditional environment, which endangers the continuing survival of rare plant species*
The idea of the "Desynchronisation" project consists of criticizing the phenomenon of "overconsumption", which is characteristic of modern society, and draw attention to the need for natural preservation. We intend to study the ways in which the artist uses various sociocultural organizations to implement her artistic goals.

- *The theme of trying to interact with trees through aesthetic methods and saving them through an “aesthetic intervention”*

In the “Le bonsaï du Taxus” project, O. Kisseleva carries out a kind of “aesthetic intervention”. In this way, she is trying to answer the scholarly challenge contained in the questions: How does this process take place? How does it expand the possibilities of topiary art? How does it affect the life of the tree?

The “Apple of Discord” project is of particular interest to us, because, as a result of her art&science quest, O. Kisseleva has come up with a unique method of resurrecting the legendary Apport apple cultivar. We will trace the way in which this project reflects the artist’s idea of implementing “ancient” knowledge in the modern world.

- *The theme of creating instruments for communicating with trees. EDEN T2N (Ethique – Durable – Ecologie – Nature) – the creation of the technology and the first experiments.*

Experiments have led the artist to conceive of the idea of creating a system that would facilitate communication between human beings and trees. The section titled “EDEN T2N” will examine the creation and functioning of this revolutionary technology. O. Kisseleva was led to create the EDEN T2N technology through her work with the elm of Biscarrosse. The idea of the project is creating a “new” Garden of Eden. Why does the artist choose to use innovative technologies to achieve her artistic goals? How do scientists use artistic modes of thought, which seem unorthodox in a scientific context? How does this approach help us solve ecological problems? We will find the answers to these and other questions by examining, in turn, all of the artists’ projects that explore this range of problems. The project titled “EDEN: The Cries and Whispers of Trees” tests the EDEN T2N technology and begins to implement the new T2T system. The T2N / T2T system is an installation created for the Echigo-Tsumari Triennale, which comprises three cedar trees – a French one, a Japanese one, and an Australian one. We intend to study the communication between closely related trees that grow on three different continents, and the way this process advances the Dendro-art philosophy of implementing an art&science utopia, which can minimize the harm inflicted on nature by time and human activity.

In the “EDEN: energy saving” project, we will study the problem of biological rhythms and its impact on the artist’s work. We will trace the way O. Kisseleva develops a system in which the amount of