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TECHNOLOGY AS A MEDIUM OF ARTISTIC CREATION: THE CASE OF BIOTECHNOLOGY

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Abstract

In recent decades, artists have lost interest in the search for new solutions. In the celebration of traditional techné, and in pursuit of means of expression, they have turned to extreme areas of human activity or to the field of science and new technologies. The latest gene-editing technologies open up new challenges for art and force a rethinking of the interpretation of projects, artefacts, performances, and installations by artists focused on biotechnology. This is especially due to the fact that, for the time being, art criticism is in thrall to a posthuman discourse (grounded in theories of postmodernism) that at various levels focuses on the nature– culture opposition, primarily delimiting the biological aspects of humans to the interspecies social relationships of human and non-human beings. Because of this, artists and critics lack appropriate philosophical concepts to develop interpretive frameworks for art that reach into the realm of empirical investigations of human nature. Transhumanist discourse seems to offer a solution of sorts. Although still evolving and facing ethical critiques, it provides a more appropriate (emulative) framework for some contemporary artistic activities than the existing posthuman discourse.

Key words: transhumanism, posthumanism, transhuman art, gene editing, co-evolution, Maja Smrekar, Patricia Piccinini

Artistic Experimentation with Technology

Since the establishment of pop art, championed by the philosopher and art critic Arthur Danto, there has been a proliferation of projects that reach out to means of expression outside the space of traditional art such as painting or sculpture. Danto (1997) believed that for the history of Western European art, addressing the philosophical aspect of "what is art" had lost its relevance, as had the insistence of art critics and art historians on emphasizing the linear progression of means of expression. He perceived contemporary art in the category of "after the end of art" (1997). Instead of tracing artistic values in the context of developmental transformations and changes, he proposed a vascular channel into which various philosophically justified artistic objects, solutions, and activities would fit.

Thanks to this paradigmatic change in the art world, there was a proliferation of art types in the media; various artistic initiatives, activisms, and experiments emerged synchronously to extend the means and methods of art into the realm of science and

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technology, where they could be perceived as artistic. There were projects created by the initiators of Experiments in Art and Technology (EAT), founded in 1966 by Robert Rauschenberg and Robert Whitman together with the engineers Billy Klüver (Klüver/Martin 2003) and Fred Waldhauer; these were artists enthusiastic about the application of the technological possibilities in art. EAT's main goal was to document the success of collaboration between artists and scientists through providing access to new materials (plastics, resins, video and electronic technologies, and even computers – which at that time were only accessible at research institutions). The organization allowed experimentation with now common technologies such as chat links, cable television, fax machines, lasers, and digital graphics. Indeed, Rauschenberg's sound sculpture Oracle (1962–1965) remains on display today.

Similar initiatives emerged in Europe. In 1969, the Institut de Recherche et Coordination Acoustique/Musique (RCAM) – which is an institute for the science of music, sound, and electroacoustic art music – was founded in France. Since 1979, the Ars Electronica festival in Austria has been dedicated to the research of digital art.

Whereas in the 1990s artists reacted mainly to problems related to communication technologies, or to communication via computer, at the turn of the millennium they were also trying to take a stance towards new biotechnologies. And that is why, until recently, information technology and even artificial intelligence have been hot topics; biotechnologies are ever riskier. The aim of this chapter is to highlight the projects of artists who respond to gene-editing biotechnologies and to explore the theories that elevate the use of specific biotechnologies in art. Two perspectives are available in these contexts: concepts developed by the discourse of posthumanism, and concepts promoted within the transhumanist movement. With the art world being more open to the discourse of posthumanism, transhumanist ideas are left aside. The question of why will be examined.

This chapter seeks to emphasize that, given the development of the real possibilities of biotechnologies (e.g. CRISPR/Cas9), it is appropriate to interpret art projects that respond to them in the context of transhumanism. This is because it is open-minded the modification of the content of gene information – of human enhancement towards a trans- and posthuman form – and more appropriate than the views of prominent posthumanists such as Katherine Hayles, Rosi Braidotti, and Francesca Ferrando, for whom the concepts of transhumanists are too optimistic and who advocate a posthuman form, which need not be considered. While it may seem that human enhancement is not a socially important topic and belongs only in the bowels of laboratories, the opportunities and risks that biotechnology promises in areas such as gene therapy, synthetic biology, and personalized medicine are increasing in importance. These tools bring with them many practical, social, and bioethical challenges as well as risks and opportunities. Some artists, such as Maja Smrekar and Patricia Piccinini, speak to this discursive and multimodal field. Projects that respond to the possibilities of biotechnology can inspire technologists to use it creatively; much more inspiring, however, is the mapping of bioethical dilemmas, contexts, reactions, and responses.

Such projects take on a deeper dimension in the context of the views of transhumanist authors about posthumanism, such as Julian Huxley and Nick Bostrom on human exceptionalism and the role humans can play in their evolutionary process (Huxley 1957)[2] and the role that advances in bio-transformative technologies and artificial intelligence can play within it (Bostrom 2008, 2020).

2 The text is referred to as the Manifesto because in its Huxley raised the issue of the refinement and evolution of humans through the discovery of their nature, and he proposed the use of the term "transhumanism".

Towards Posthuman Art

Although the transhumanist movement has been established in Anglo-American academic circles (Grassie/Hansell 2011), posthumanism has a stronger position and a longer tradition in that realm. According to Jay David Bolter (2016), posthumanism is grounded on the following pillars: postmodernism theory, studies of the history of science and technology 39 The text is referred to as the Manifesto because in its Huxley raised the issue of the refinement and evolution of humans through the discovery of their nature, and he proposed the use of the term "transhumanism". promoted by Bruno Latour, feminism, computer science, artificial intelligence research, and social network studies – with the fundamental form of the posthuman subject being the cyborg (Haraway 2016). Based on the frequency and intensity of influences on academics, theories, concepts, and views framed by posthumanism, Ferrando (2019) believes that it is no longer a process of their establishment at American universities but rather a fundamental change in the subject matter and methods of the humanities. This will be a new dominance of the humanities that insists on a new form as the New Humanities, which will remove from its centre the hitherto liberal subject. The subject of the New Humanities is the posthuman subject (Ferrando, 2019)[3].

As a movement, the New Humanities are conceived differently from the transhumanist movement, which both develops both the concept of the posthuman as a continuation of the humanist tradition (Bostrom, 2008; More, 2013) and the prefixes "trans-" and "post-" as references to evolutionary theory (Huxley, 1957). In art criticism, trans- and posthumanism function as synonyms as diverse relationships of subordination, inclusion, and conflict ("bias"; LaGrandeur, 2014) are projected between them. This is due to the influence of the discourse of posthumanism in the academic world and art world and the lack (or impossibility) of discussion of posthumans among figures within both discourses.

In the present discussion, transhumanism most often simply complicates definitions of posthumanism (Wolfe, 2010). Academics choose different solutions in this context; for example, Stefan Herbrechter (2013, p. 16) expands and opens the field of posthumanism in different aspects, proposing a twofold morphological division of posthumanism into "posthumanism" and "posthuman-ism". The former is understood as diverse critical reactions to the deconstructions of humanism, and the latter is reserved for the philosophy of such future beings who will transcend the limitations of today's humans. In this context, Herbrechter adopts the concept of transhumanism. Omitting transhumanism in the discourse on the posthuman is sometimes associated with a methodological solution that combines a deep affection for deconstruction with techno-scepticism, such as in Braidotti's book The Posthuman, where Nick Bostrom's views on the posthuman are simply pushed out of the discussion (Braidotti, 2013: 89).

In its extreme form, there are confused formulations. Art critics understand transhumanism as "a more radical form of posthumanism", as can be seen in Posthumanism and Contemporary Art (Kordic/Godward/Martinique, 2016), and thus as something opposite to what transhumanists themselves think. Why do art and academic critics neglect and ignore transhumanist thinking about the posthuman?

The intensity and unstoppable impact of posthumanism in the academic environment lets us believe that it will act with the same force in the art world. Postmodernism itself acted in an analogous way, which, according to Danto, from the mid-twentieth century onwards provided artists in the United States with theories and philosophies to frame the creation and interpretation of art and provide a prism through which to

3 Ferrando (2019) distinguishes three kinds of posthumanism centred around: critical theories (critical posthumanism), theories of culture (cultural posthumanism), and philosophies (philosophical posthumanism).

understand and interpret all the problems of the world in which they lived. Since the domestic environment did not provide a 40 Ferrando (2019) distinguishes three kinds of posthumanism centred around: critical theories (critical posthumanism), theories of culture (cultural posthumanism), and philosophies (philosophical posthumanism). suitable philosophical background, the imported creation that was at hand worked. Through such an open door into the world of art, posthumanism could easily enter and run behind postmodernism. This assumption is confirmed by publications such as Kevin LaGrandeur's essay "Art and Posthuman", published in the book Posthuman: Future of Homo Sapiens (2018) and an exhibition catalogue.

As is well known, since the 1960s, these academic and technological circles have been fascinated by the idea of human–machine symbiosis, which foreshadowed thinking about the future of humans as computer simulations and models of information systems. The posthuman was projected as a refinement of the process of adaptation of the human brain to a hybrid bioinformatics environment. LaGrandeur promotes the concept of the human understood as an information system in which the individual is constituted by a network of subjects and things. (As LaGrandeur writes, the value of today's human is determined by their activity on social networks.) The body is thus interchangeable with another substrate; it is extensible (through prostheses, interfaces, and biotechnologies) mainly because the human brain is a prosthesis that produces ideas.

This concept of the extension of the prosthetic brain suggests that the transformation to the posthuman – verbalized admittedly in much the same way by some transhumanists (the storage of human thought in inorganic substrates is also advocated by some transhumanists) – is seen by LaGrandeur as the projection of changes to the body and the brain beyond present day human nature through cyborgization and the addition of prosthetic systems, be they digital, genetic, or biotechnological. For transhumanism (as Huxley put it: the enhancement of the human through the refinement of its natural capacities discovered through scientific, especially biological, research), conceiving of the human brain as a prosthesis for the body is unacceptable. Even today's research on things such as emotions proves that it is impossible to separate the evolution of the brain from the evolution of the human species (or the evolution of the group of Anthropos). Already here one can see the distinctiveness of the concepts of the posthuman in the discourses of post- and transhumanists.

Prominent environments that promote a posthumanist perspective for art that collaborates with new technologies include MIT's Media Lab (LaGrandeur) and Silicon Valley (Hayles). It is in these environments, which intensively develop new technologies, that opinion-forming works with a global reach of collaborating experts in literature, art, and psychology emerge. On the one hand, they cultivate communication between science and art as well as the social sciences (the third culture), and yet they cannot resist the pressure of scientific authority, which, according to Danto, overwhelmed philosophy in the United States and confined it to the boundaries of analytic philosophy since before the Second World War – well before the period of the import of postmodernism (Danto 1997). The posthumanist discourse put forward by the MIT Media Lab is unfree. The interests of art, philosophy, and psychology presented by it cater to the demands of technology, and especially information technology. They leave biotechnology aside. It is a milieu that promotes the notion that scientists today can (reliably) predict the technological future. As Siegfried Zielinski (2013) summarized, traditional philosophical themes and methods are seen as narratives of philosophy's past (which, according to Norbert Wiener, the founder of cybernetics, will be replaced by technology) and as narratives of a humanist past that has been overtaken. This view can be reiterated and emphasized: posthumanism promotes the desire to get rid of the humanist past, forget the autonomous subject as an unnecessary burden, and think only of a future human in which there will be no trace of the human itself. More conservative viewpoints are given by some transhumanists (More, 2013; Bostrom, 2008).

Transhumanism as human exceptionalism

Human exceptionalism (the humanist subject) does not merely live in the philosophical rationalist tradition. Its transcendence (the posthumanist subject) is not linked, as is traditionally held in the discourse of posthumanism (Braidotti, 2013; Herbrechter, 2013; Wolfe, 2010), with the notion of the human as the Biblical lord of creation, as being hierarchically subordinate. Nor is it based solely on the Enlightenment uniqueness of the res cogitans. It is anchored in humans' destiny to navigate their own evolution (Huxley, 1957). According to Huxley, humans, despite being a life form younger than microorganisms, create a revolutionary life form capable of conceptual thought, self-awareness, and the conscious accumulation of experience. According to this pioneer of transhumanism, the human species has evolved to a level at which it has such promising prospects of self-knowledge and such a great yet not fully discovered potential of its abilities and its nature that – if it so desires – it can surpass itself through the realization of new possibilities. And not only individually; it can transform the whole of humanity into a transhuman form. The transhuman (Bostrom, 2008) will still be a human, but they will already have consciously fulfilled the destiny set in motion by their evolution; there will already be enough people alive who will have so deepened their natural human qualities and capacities that they will have reached the threshold of a new transhuman existence that is significantly different from that of Homo sapiens. The species differentiation that Huxley projects is analogous to how Homo sapiens differentiated itself from its predecessors (e.g. Peking Man). Huxley raises the continuation of the process of evolution, but he does not speak of crossing the threshold of transhumanism nor does he speak of what the new existence beyond the imaginary threshold should be called. This step has been taken by the futurist FM-2030 (Fereidoun M. Esfandiary by his own name) and Bostrom, who contemplate a new posthuman species. The followers of Huxley, especially the signatories of the Transhumanist Declaration, associate with the posthuman the very possibility of the coming of age and crossing this threshold. This raises an unresolved question, what does it mean evolutionarily and ontologically to reach the threshold of a new species? Will there be any distinct beings that will have to coexist and co-operate? Will people who have voluntarily chosen or been forced to transform shed the "dark side" of human nature? Huxley apparently assumed that the age of transhumanism would be a process of the transcendence of man, who would, however, must coexist with members of Homo sapiens. Will this stage of evolution come with a process of the co-evolution of man with transhuman individuals, a kind of symbiosis of man with his enhanced form? In this context, the discovery of man set forth by Huxley has found its Columbus in recent decades in the form of accelerating science and new technologies. The promoters of the transhumanist movement give them an essential place in the process of human transcendence: in particular, cryonics, artificial intelligence, and genetics (distributed by the Transhumanist Declaration). Technologies will participate in the fulfilment of human destiny (Bostrom, 2008; Vita-More, 2018), even if little (Bostrom, 2008) or almost nothing is left of humans in the next form of existence.

It is hard to know what path humankind will take and whether it will discover a suitable navigational model for fulfilling and using its potential. How will the adherents and participants in the procedures provided by science, technology, and transhuman business coexist with those who have no interest in undergoing them? What forms of human transcendence is art already noticing today?

Artists who are interested in human transformation into a transhuman or posthuman form (Vita-More, 2018) prefer digital tools, which is why their works are often assigned to digital and electronic art or refer to biotechnology and are associated with bioart. In addition to the typology based on the medium used (as a tool and a carrier), as the discourse of new media has it, what is important is the artists' attitude towards the idea of the future of the human as a being in which there will (or will not) be a human trace. We may naively believe that the transformation of humans to posthumans through pro-

cesses of enhancement – even[4] with gene-editing tools – gives it a chance. By contrast, if we limit a person to the mind and manipulation of it, this issue is irrelevant.

Similarly, Braidotti, a prominent promoter of posthumanism, is not open to the tools of biotechnology embedded in contemporary science. This can be concluded from her view of the natural basis of humankind and of life. According to her, "life manifests itself in a set of empirical acts," it "manifests itself in the actualization of the flow of energy," it "manifests itself in codes of vital information operating within complex somatic, cultural, and technologically networked systems" (Braidotti, 2013, p. 349); however, Braidotti says nothing about genetic information. Based on this and similar attitudes towards considering life in a posthuman discourse, and thus evolution, one can agree with Stefan Lorenz Sorgner (2013, p. 87) that the issue of the future development of humans in an evolutionary and bioethical sense is unacceptable for posthuman discourse.

The importance of the human footprint for trans- and posthumanism

From at least the mid-1990s onwards, ideas of determining culture through communication technologies (McLuhan, 1964) have strengthened. The development of information systems has fuelled the vision of a radical digital revolution and the notion of a future human development independent of corporeality, including the biological and sociobiological planes of the brain's functioning. In How We Became Posthuman (1999), a foundational book for the field of electronic art, Katherine Hayles asserts that the functioning of the human brain, which she sees as an interface, has acquired characteristics like Homo sapiens did in the past, and is acquiring characteristics in the present that have transformed it. She promotes the view that the brain has been a prosthesis for humans and presents the notion of an "extra-human condition/state". The result of this process will be a posthuman existence divorced from all that we consider to be human. Nonetheless, this is difficult and problematic; it can be accomplished through the storage of the mind in a new substrate through the transfer of brain functions to another information system. This perspective of the posthuman being as part of a network of systems of bytes and things has long inspired artists and experimenters, especially in the fields of computer art, electronic literature, software art, and code poetry (Suwara, 2014). Concentrating on projects both created and presented through computers has permeated posthuman discourse in art and literature (Bolter, 2016). What then is the difference between Hayles's posthumanism and the notion of a posthuman species of transhumanists?

Hayles's radical notion is aimed at a transformation that will create a new, perhaps irrational, existence in which no trace of humans remains, while the transhumanists maintain some elements. Max More (2013) highlights transhumanism's continued high regard for the values of humanism, such as respect for reason and science, commitment to progress, and admiration for the human (and transhuman) form of existence. Bostrom – even as he contemplates a transhuman whose goal is to become posthuman and as he projects a being that is admittedly different physically, cognitively, and emotionally from normal contemporary humans to the point where it will no longer be unambiguously human (Bostrom, 2020) – still desires that something of the human be preserved in the new being, even if this is very little. The fulfilment of this desire can be named the "human footprint" in the future form of the posthuman.

Although concepts and theories of posthumanism abundantly frame the discourse of the humanities and arts today, recent developments in CRISPR/Cas9 biotechnology

4 The risks associated with biotechnology should also be highlighted here; transhumanists do not underestimate them. In short, there is the risk associated with the fact that a little-known (as-yet) untested technology can cause consequences in the genome beyond what researchers have planned for, bringing consequences they have no idea or clue about (Johnson 2019).

inspire a return to transhumanism. This is especially so because of the gravitas that biotechnology poses for transhumanism.

Despite the introduced drawback of the notion of transhumanism, a return to its presented concepts provides an opportunity to single out from the typology of bioart those projects whose symbolic meanings are based more on an evolutionary model of human nature (e.g. Steven Pinker) than on a model of a network of agents or the "co-habitation" and "imbrication of distinct metabolisms" interpreted in terms of social relations (Haraway, 2016)[5] or the concept of a "new anthropology" (Sorgner, 2013).

In 2017, Smrekar won the main prize for experimenting with biotechnology on her own body. Her projects were created at Kapelna Gallery in Slovenia, which focuses on a practical collaboration between artists and science and research that should take into account the bioethical aspect; however, from a philosophical perspective, Smrekar's framing of the projects within the artistic and literary discourse of posthumanism confirms that the philosophical concepts of the transhumanists, which directly invoke biotechnology in the process of human transformation, do not reach the artists. This is not because of the local scope of transhumanism in the Anglophone sphere (Sorgner, 2013) but is rather because of the prevalence of concepts of human nature, freed from scientific essentialism, in the humanities and the arts. Donna Haraway's notion of the evolution of species, which highlights the strategies and metaphors of the rhetoric of science that scientists have used to talk about evolution and how they have thought about it from an anthropocentric and patriarchal perspective, is very influential. A second concept of relevance in this respect is Bruno Latour's (1997) sociology of science.[6] The tendency to remove the concept of species in the sense of evolutionary theory, or the natural human species, and to replace it with a kind of universal "cultural species" (analogous to the cultural concept of the human race) is crucial.

Transhuman art: the role of art for the human who will want to be posthuman

Huxley held the view that the exploration of man as an unknown territory for the discovery of his intellectual and mental faculties has been outlined by scholars and writers from antiquity to the present day, with the exception of the Romantic era; this was elaborated on by Bostrom (2008) as a time when artists rejected rational concepts and succumbed to irrationalism and were interested in the sublimation of the mind to perfection. Both scientific knowledge and art offer possibilities and provide opportunities to explore human nature. In the process of the transcendence of the human species, Huxley envisages the same role of exploration and qualitative deepening for science and art. This is simultaneously an anticipation of the tendency known as art@science.

Bostrom outlines the role of art for the person who will want to be a posthuman, in a paper titled "Why I Want to Be a Posthuman When I Grow Up". He suggests that the posthuman will be happy to create new art forms and styles and will shift the development of English under the influence of technology; new linguistic expressions will provide a means of expressing and discussing unimaginable feelings and experiences because they will be tied to enhanced cognitive and emotional abilities. This attributes an essential function to play (Homo ludens), which will co-create hybrid art and be a full-fledged agent. Virtual reality will provide artistic means to combine with dance and humour, and the newly acquired possibilities of interpersonal dynamics will allow us to make things related to bodily sensations and the mind more fun, enjoyable, and creative than we can imagine without technological enhancement. Art thus becomes a form of joy; art becomes a form of play and an opportunity to experience more intense and creative

5 See: Pavlovic (2019).

6 Bolter (2016) ranks both authors and their postmodern concepts among the pillars that constitute posthumanism

experiences through new means. It will be "new"; after all, what else can we call the fact that art will rely on means and materials hitherto unknown to us? Will it speak of a trans- or posthuman style of life? Does the idea of art as a wave of historical change therefore lose its meaning? Perhaps this is the case to the extent that Danto speaks of grasping and naming historical change always in hindsight. For us, however, it is mainly a question of what contemporary transhumanist art is about and by what means artists create it.

The Context of Biotechnology : CRISPR Projects

Designer Adam Peacock presented "The Genetics of GYM"[7] as a series of works at an exhibition at the Melbourne Gallery in 2018. Against the assumed effort of transhumanists to influence the process of human transformation, and against the freedom to decide on the form of bodily form, he contrasted marketing strategies that will put us at risk from the unforeseen but assumed interests of bio-business. In this context, today's design strategy, based on the principle of ignoring all standards, playing with crossing and erasing boundaries, and playing with things like tradition, must move towards responsibility and deliberation. If it were possible for gene-editing technologies to unleash the fantasy of designing human corporeality – for example into discordant forms such as those presented by the Genetics GYM project – the question arises as to what needs to be done to make today's humans fit and responsible enough for these tasks. These questions are relevant to both transhumanist art and bioethics.

The co-evolution of the human with the non-human animal

Maja Smrekar and Patricia Piccinini produce art which seeks inspiration and a means of expression in biotechnology and genetic engineering, and which, according to critics, is a part of bioart while also implicitly referring to and addressing the issue of transhuman art. Piccinini is dedicated to the promotion of modern science and the ethical problems of biotechnology. In her exhibitions, she organizes workshops – for example, with child visitors – on the subject of transplants and the creation of human organs in the bodies of non-human animals. Her activity does not merely refer to the question of the blurring of species boundaries that preoccupies posthumanists (Haraway 2016); it clearly also refers to the results of contemporary genetics.

Her Evolution and Curious Affection exhibitions were popular in several galleries, despite the fact that the sculptures on display represented a "bizarre beauty". The intention was not to pander to the predilection for anatomical or physiological anomalies, which was once the delight of visitors to fairs, circuses, and daguerreotypes. Instead, the aim was to document one form of a world in which DNA is understood as something universally interchangeable and plastically amenable to editing (genetic editing) (interview on YouTube).[8] At a time when the evolution of the human body is not complete and our proteins are extremely plastic (Piccinini), it is necessary to open our imagination to the various possible aspects and problems of the "transhuman human". In Piccinini's artefacts, according to the critics, these are chimerical beings, but the question that comes to the fore is how we will shape the relationship between the human and the trans- or posthuman being. What will be the place and value of human footprints: friendship, generosity, emotional alliance, belonging, intimacy, love, kindness, and generosity?

Smrekar's projects were created in collaboration with the Kaplna Gallery in Ljublja-

7 Available at: https://www.adampeacock.co.uk/Science-Gallery-Melbourne-Perfection (Accessed June 7, 2019).

8 Piccinini's presentations, which are also available on the internet, prove the validity of Danto's premise that in the time "after the end of art" an artist cannot lack knowledge of the subject they are dealing with (Danto, 1997, p. 193).

na, which focuses on cooperation with a medical faculty and a genetic engineering laboratory. (Similar science galleries have been created within universities, for example, in London, Dublin, and Melbourne, and as civic associations, such as Galeria Galtea in London). In 2017, Smrekar won an award at the Ars Electronica festival in Linz for her set of long-term projects entitled K9-Topology, Hybrid Family, and ARTEmis. The jury particularly appreciated her determination to experiment with her own body, which she put in danger when overcoming her fear of a wild animal and undergoing artificial insemination.

The K9-Topology multimedia installation refers to the process of the evolution of humans in the pre-cultural era, when they spent a lot of time with wolves. Visitors could enter a cave/tunnel lined with wolf fur, which had trays of synthetically isolated (by column 45 Piccinini's presentations, which are also available on the internet, prove the validity of Danto's premise that in the time "after the end of art" an artist cannot lack knowledge of the subject they are dealing with (Danto, 1997, p. 193). chromography technique) wolf (canis) serotonin and Smrekar's serotonin. This was an opportunity to experience, through olfactory sensations, a simulation of the relationship between humans and wolves. The visitor could smell the scents which humans had become accustomed to when, living with wolves, there was a co-evolution and mutual taming of humans and wolves, which is analogous to the symbiosis Hayles projects for humans and computers. This scent is not on the spectrum of acceptable smells today, and therefore, from an evolutionary perspective, the sense of smell as such is not stable; it has been diversely distributed in the process of evolution and has either deepened or narrowed. Smrekar explains that the process of the mutual domestication of humans and wolves (now dogs) is a scientific discovery based on the finding that in both species the genes responsible for the formation of transporters for enzymes enabling the metabolism of starch (cereals) appeared simultaneously as a stage of parallel evolution of the digestive tract. (In wolves, these genes have not evolved.) Olfactory perception was similarly strongly developed in both humans and wolves, but modern humans have lost the capacity for fine olfactory sensitivity; in its place, evolution fostered the visual and verbal faculties in humans. The degenerate olfactory senses in wolves, on the other hand, have been enhanced. Humans evolved the gene responsible for transporting serotonin, responsible for the ability to tolerate the presence of multiple individuals for long periods of time, and thus evolved social tolerance, as interpreted by researchers today. An enzyme reducing the aggression of the still untamed human made possible the changes that gave rise to human culture.

Through K9-Topology, Smrekar provided gallery visitors with the experience of encountering olfactory sensations that have been forgotten and that refer to the scientific discoveries of the details of evolution. She intended to create a matrix with which to explore issues of communication and understanding in society. Is it possible that the scents of the transhuman world will be similarly unusual and surprising, and that the adventures of the coevolution of Homo sapiens and the posthuman species will be similarly complex?

Smrekar attempted to provide an experience of developing our olfactory sensations, but in the second part of the project she undertook an experiment to explore and push the limits of the fear that was triggered by an encounter with a wild animal (a breed of dog akin to wolves). This is a fear caused by the presence of individuals of another species. The aim of the project was to overcome human fear, adopt and penetrate non-human company, and establish an understanding with the pack (three female dogs and three female wolves). The six-month project was carried out with the help of French ethologists. From the stage of enduring the artist's presence from behind metal bars, through several-minute-long visits to the animals' territory, Smrekar reached the moment when one of the females made contact with her (touching her hand, which meant acceptance into their society). This was a sign of acceptance based on the fact that the artist had already mastered the rules of communication well enough to provide a sense

of security to all members of the pack (not making visual contact with the alpha male and showing respect for the hierarchy in the group). The project concluded with a performance in which the audience, from behind the bars, participated in a climactic form of understanding between a human individual and non-human beings: the artist was lying on the ground (i.e. in the lowest position) and was smeared with grease, also spread outside her body; the pack then spent their time licking their favourite edible from her body.

Emotions were experienced by the visitors (shifting the initial fear from the artist to them) and by the main actor of the event (the need for concentration and relaxation). Another problem was one of responsibility: the ethologists and the trainers of the pack took responsibility for the artist in a certain way, but the animals could also be at risk if they interrupted the rehearsed modus and attacked due to inappropriate behaviour by the audience.

From a posthumanist perspective, the project gave the opportunity to participate in feelings of enforced subordination, in experiencing uncomfortable feelings of humiliation and fears for one's safety, as well as fear of the inscrutability of power experienced by a being in a more powerful position. The performance legitimized the questioning of the concept of the rationalist premise of human exceptionalism and dominance in nature (Bolter, 2016). The project non-intentionally also refers to extropism and to the notion of the expansion of emotional capacities (Bostrom 2008). In doing so, it opens the perspective of future human development, realizing an archaeology of the future. The concept of extropism was picked up by the signatories of the Transhumanist Declaration, who extended the idea of the nonhierarchical coexistence of human and non-human beings to artificial intelligence. The question arises as to whether today's humans, who often cannot tame their distance from members of other races and cultures, can accept the proximity of genetically modified humans or representatives of "other" species. Will humans be able to renounce their superiority and take responsibility for the fate of the more or less different "Other"? How will they interact with these other beings at the level of the concept of the self if they are not genetically identical to them? On a psychological level, one solution is training aimed at expanding the ability to experience unpleasant feelings and to control, for example, feelings of disgust, reluctance, and intolerance. According to Bostrom, a person coping with unpleasant feelings is also a part of the process of transformation.

Hybrid Family

In the Hybrid Family project, which lasted six months, Smrekar experimented with adopting a dog. In order to fulfil the role of a mother who breastfed her puppy with her own milk, she had to start milk production by adjusting her diet, enriching it with iron, taking a milkproducing product, and inducing oxytocin production by stimulating her nipples. Oxytocin sends instructions to the brain to produce milk, and the hormone itself boosts nursing tendencies.

Smrekar modified the gallery room into a cosy home, and eight weeks after adoption she was able to breastfeed the dog with her own milk. Visitors to the project were able to observe the feeding of the puppy. As a thirty-six-year-old childless woman, Smrekar experienced genuine maternal emotions and instincts through adoption and artificial stimulation, creating the experience of a hybrid family.

The artificial stimulation of the human body in order to achieve the natural nurturing instinct and care for one's offspring was an incentive to experience feelings of joy, fulfilment, love, identification, responsibility, and kindness – feelings and values valued by transhumanist hedonism. We can imagine that by using biotechnology (be it genetic or pharmacological), humans can overcome natural limitations and stimulate, for example, in old age, feelings associated with a high quality and value of life. In the context of (presumed) interspecies communication, we can imagine that a transhuman woman would

be happy to care for and adopt a Homo sapiens offspring with the possibility to fulfil, deepen, and refine feelings associated with motherhood.

ARTEmis

The third project, called ARTEmis, took the form of a demonic beast. Its starting point was the premise that humans, in relation to demonic animals, turn into the very same thing. The name of the project anticipates the name of the mythological goddess of hunting, virginity, and childbirth. According to some ancient texts, she was also a lover of animals. The use of the letter's "art" refers to the practice of assisted reproductive technology. The aim of the project was to empirically investigate the possibilities of creating a female wolf-like creature; however, from a genetic viewpoint, only a clone of her could have been created.

Smrekar had one of her eggs artificially fertilized with a somatic cell, the division of which created a blastocyst. She named it ARTEmis as a confrontation of mythology with technology. Informed by concepts interpreted in the discourse of posthumanism, Smrekar pursued the problem of interpreting the notion of humanism,46 which she understood as the incorporation of the essence of the human into the natural non-human universe and as an empirical confirmation of the animal continuum in humans, which is (and, at the same time, is not) alien. The concept of the human is the foundation of our exceptionalism and condescension. Smrekar's intention was to provoke public debate about the future of species hybrids: for example, those that would arise from the crossbreeding of humans and nonhumans. From a biotechnological viewpoint, interspecies crossbreeding is more difficult and less likely than introducing a series of genes that can transform the human species. This vision and the realistic technological possibilities of achieving it are the subject of bioethical debate, but this has not yet penetrated the realm of posthumanist discourse.

Conclusions

Biotechnologies have aroused the interest of creators of art, which for several decades has been coping with the search for a means of expression outside traditional media and has absorbed them into itself. These are technologies that touch both the present and the future of humanity. To interpret projects that respond to the possibilities and risks of using the tools of biotechnology, the art world reaches into the discourse of posthumanism (cyborgs and networks of systems) and ignores the significance of transhumanist concepts (the enhancement of human nature). This chapter emphasized that the reasons lie both in the persistence of the influences of postmodernism and in the authority of institutions that promote a technical vision of the world of the future (e.g. Silicon Valley and MIT's MediaLab) and, within it, present notions of a posthuman form of humans.

In this field, transhumanist conceptions of posthuman humans which emphasize the biological evolution of the nature of Homo sapiens are at a disadvantage, as is the case in posthumanist discourse. As a result, the art world interprets art projects, even if they are a 46 Discussions and reflections on the diverse contexts and implications of the notions of humanism, the humanistic, the humane, and the posthuman are inherent in publications on posthumanism. response and reaction to biotechnology, in an inappropriately narrow frame that concentrates on posthumanism.

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