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The Art of Becoming: Tracing Technological Transformation and His Perception in Society

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Abstract: Throughout the past century, technology integration into the human body has experienced remarkable growth, finding its expression through specific artistic movements that have acted as catalysts for acceptance and societal transformation. This article delves into the examination of three paradigm shifts that underpin this profound evolution. The first shift marks a departure from curative treatments for disabilities, shifting towards a focus on augmentative improvements. Subsequently, the second shift propelled the enhancement of healthy bodies, driven by the visionary concept of posthumanism, which envisions transcending the limits of our species through technology. Today, we find ourselves amidst the third paradigm shift, characterized by the practical cyborgization of society, made possible by the emergence of new cyborgs. By critically reflecting on the practices of these cyborgs, we gain valuable insights into the potential challenges and implications that technology may pose in the future. Crucially, this research highlights the indispensable role that art and aesthetics have played in shaping the social perception of technology integrated into the human body. Art, serving as a safer avenue for experimentation than scientific research, has become instrumental in presenting and normalizing these groundbreaking ideas within the public imagination. By exploring the intersections of art, technology, and human bodies, we can navigate the complex terrain of our ever-evolving relationship with technology and anticipate the profound implications it holds.

Keywords: Body Art, Human Enhancement, Human-technology integration, Posthumanism, Transhumanism.

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1. First Paradigm Shift: From Restoration to Improvement

This section will explore the 20th-century paradigm shift towards integrating technology into human beings, focusing on a forward motion that started in restoration and developed into improvement. To study the history of the restoration of human organs, we have to go back at least as far as Ancient Egypt, as can be witnessed by mummies found with wooden legs, feet, or fingers.[1] However, although prostheses can be found throughout history, they were not created as such by physicians until the 16th century.[2] People with disabilities were not considered important to their society, and their survival and well-being were left at the mercy of religious institutions.[3] Gradually, the development of medical science, on the one hand, and the growing sensitivity to the individual, on the other, were preparing the shift towards the turn that

[1] Jacqueline, "The art of medicine. The ancient origins of prosthetic medicine". *The Lancet*, 377, nº 9765 (2011): 548 – 549.
[2] Bandeira, & Silva, Corpo e prótese: entre a tecnologia, a arte e a ressacralização. In *Anales del VI Simpósio Internacional de Innovación en Medios Interactivos*. Mutaciones. Rocha, C.; Groisman, M. (orgs). Universidad de Buenos Aires.
[3] Sogabe, & Ikeda. Prosthesis in Design and Art. *DAT Journal*, *7*(2), 9

occurred in the 20th century when external devices began to adapt to the human being in such a way that they might be understood as part of him. At the same time, the expansion of those techniques became crucial. By the end of World War I (WWI), as thousands of wounded soldiers returned home with amputated limbs and as medical breakthroughs radically improved survival rates, the use of prostheses became unprecedentedly normalized among veterans.[4] These prosthetic devices were not always designed in the likeness of lost limbs. They were often functional tools whose sole purpose was to allow the amputated veterans to regain some mobility functions to (re)enter the workforce through technical professions such as farming, welding, carpentry, etc. To do that, they received a new member, which was, in reality, a specific tool to work.

Although most perceived prostheses as a token of progress, some—including avant-garde artists such as Otto Dix, George Grosz, and Heinrich Hoerle—criticized the dehumanization they sometimes entailed. While these German artists raised concern about the alienation of the body when it was subject to technological insertions, there were other avant-garde artists who, instead, saw prostheses as a new way to represent the human body. These creations are often deemed unimportant because they are considered mere games without repercussions. However, we try to defend how artworks shape the standard image of a time and frequently mark the way forward. This is because art, serving as a safer avenue for experimentation than scientific research, is crucial in presenting and normalizing these ideas within the public imagination. In this regard, the representations of Dadaists Raoul Hausmann and Hannah Höch were very important. Their collages present potential self-ideals in the form of robot-like images of alternative forms of existence that could trigger the viewers to shift their perception of themselves by reconsidering who and what they are.[5] Also, at the International Dada Fair (1920), the participating artists projected new creative possibilities in which the mechanical aspects of the new human body were promoted.[6] As described in its manifesto, Dadaism is not only an artistic movement but also an ideology of experimental self-transformation; they believed that by changing themselves, "they could inspire others to do the same and, in this way, collectively develop new styles of living to radically alter their society".[7] Not only did this Dadaists' artistic awareness turn the perception of technology integrated into the body as being aesthetic, but it also promoted its normativity. With their various artistic creations, Dada artists presented their ideas of the bionic body as a model of the emancipated human being of the future for whom society was awaiting.

However, as Martin Heidegger points out, the essence of technology is not technological but metaphysical.[8] If technology has to do with metaphysics, it has to do with sense. Therefore, the application of technology cannot be neutral: "We are delivered over to it in the worst possible way when we regard it as something neutral".[9] In other words, its moral qualification does not depend only on its use because the use of technology shapes the action in itself. As it will be noted, technology applied to the body is an extension of

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[4] McMurtrie, (1918). *Reconstructing the Crippled Soldier*, 3.
[5] Biro, *The Dada Cyborg. Visions of the New Human in Weimar Berlin*, 14.
[6] Rasula, *Dadá. El cambio radical del siglo XX*, 110-123.
[7] Biro, *The Dada Cyborg,* 110.
[8] Heidegger, *The Question Concerning Technology and Other Essays,* 116.
[9] Heidegger, *The Question Concerning Technology*, 4. Cfr. Rae, Being and Technology: Heidegger on the Overcoming of Metaphysics*. Journal of the British Society for Phenomenology, 43* (3), 305-325.

the body and a transformation. Technology cannot be used without being transformed by it. The more internal the incorporation, the more profound the transformation.

Following the post-WWI growth of prosthetic devices usage, the Space Race constitutes a second key historical moment that enabled the first paradigm swift. Human spaceflights and Moon walks were a challenge that put scientists under tremendous pressure to conceive, develop and implement technological devices and solutions. Within this context, the word "cyborg," —an acronym for "cybernetic organism" — was first used. Cyborg research was exclusive to cyber medicine from 1948 to 1960.[10] In 1960, Manfred E. Clynes, head of scientific research at the Rockland State Hospital (New York), and Nathan S. Kline, an expert in therapeutic drugs, presented a paper at a military conference on space medicine about the changes required for the human body to partake in space travel. They described a cyborg as a human body that has been technologically modified with cybernetics. The challenges entwined with space travel made it necessary to actively intervene in the biological evolution of the human body so that life could survive outside of planet Earth. For Clynes and Kline, this meant altering the human body to allow it to endure extraterrestrial life in space as if it was its natural habitat. They explain that "if a fish wished to live on land, it could not readily do so." If, however, a particularly intelligent and resourceful fish could be found, with engineer studies and excellent lab facilities, "this fish could conceivably have the ability to design an instrument which would allow him to live on land and breathe air quite readily".[11]

Their allegory reveals the magnitude of their proposed scientific advancements. The technology available in the 1960s led these authors to believe that it would be possible to alter the body so that humans could eventually adapt to any chosen environment, even an extraterrestrial one. They saw the evolutionary processes that usually take place over millions of years through natural selection as possible to achieve in less than a generation using technology. Focusing on the body alterations needed for a human being to go to the Moon, Clynes, and Kline first considered basic elements necessary for survival, such as breathing, eating, sleeping, warmth, etc. They first proposed to mimic features found in nature before quickly turning towards technological solutions, which would adapt and regulate the body to make it viable in space:

For the exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously, we propose the term "Cyborg." The cyborg deliberately incorporates exogenous components extending the self-regulatory control function of the organism in order to adapt it to new environments. If a man in space, in addition to flying, must continuously be checking on things and adjusting keep himself alive, he becomes a thrall to the machine. The purpose of the cyborg and his homeostatic systems is to provide an organizational system in which such robot-like problems are taken care of automatically and unconsciously, leaving man free to explore, create, think, and feel.[12]

After introducing their methodological approach, the authors listed medical issues that must be considered for the body in space.[13] Although they failed to provide convincing solutions, their confidence in

[10] Kline, "Where are the Cyborgs is Cybernetics?". *Social Studies of Science, 39*(3), 333.
[11] Clynes & Kline, "Cyborgs and Space", *Astronautics, 5*(9): 26–27, 74–76.
[12] Clynes & Kline, "Cyborgs and Space". 27.
[13] Clynes & Kline, "Cyborgs and Space", 74-76.

incorporating cyber technology into their research was evident in their following experiments. In 1963, following NASA's launch of its Division of Biotechnology and Human Research, Robert Driscoll, the division's director, presented a study entitled: "Engineering Man for Space: The Cyborg Study".[14] It was concerned with analyzing various techniques necessary to alter the human body to adapt to a non-terrestrial environment, such as the possibility of replacing human organs, administering drugs, or enabling hibernation to reduce stress during space travel. However, the study concluded that no solutions were possible with the available technology. In addition, Clynes carried out at least three more cyborg research projects in which he tried to: manipulate human emotions, genetically modify human beings to improve some of their characteristics, such as their emotional range, and separate the mind and the body. Although these projects did not generate conclusive results, they allowed further research progress focusing on both military and, slowly but surely, in any environments. Nevertheless, as Daniel Halacy asserts in *Cyborg: Evolution of the Superman*[15], beyond these specific research examples, the assumption that the proposed methods and solutions would improve the body and human capabilities to adapt to foreign environments remains essential.

From the 1960s on, research and discourses on cyborgs increased throughout the Cold War, which increased investments in this sector.[16] Many considered that the first country to alter the human body through technology successfully would be the first to reach space. Eventually, this hypothesis was refuted as, to reach the Moon, scientists increased the endogenic shortcomings of the human body using exogenic technology as a space suit. Nevertheless, this race for cyber technology fueled the scientific world's imagination and gave birth to the dream of an "improved" human body in the form of a cyborg. This new being soon entered the collective imagination through science fiction, which spread the idea that they could be helpful to humanity. This resulted in a certain normalization of those new biotechnological beings. Again, art was a means by which these ideas spread to the collective imagination. For instance, in the novel *Cyborg* (1972), Martin Caidin presents a super cyborg man who wants to save humanity. Also, the series *The Six Million Dollar Man* (1973-1978), based on Caidin's novel, consolidates the cyborg figure.

After exploring the 20th-century paradigm shift towards integrating technology into human beings, the discourse shifted from recovering limbs or restoring lost abilities to transforming and improving bodies without disabilities. To explain how we passed from the idea of improving human beings through technology to the desire for enhancement and transcendence of the human species, we must consider the modification of the language. Some scientists, such as Julian Huxley, changed the term eugenics to Transhumanism (Huxley, 1957, 17). The development of how this modification happened will be crucial to understanding the following changes in perception of the application of technology to the body in the following section.

2. Second Paradigm Shift: From Improvement to Enhancement

[14] Driscoll, Engineering Man for Space: The Cyborg Study. *Report to NASA Biotechnology and Human Research*. In C. H. Gray (Ed.). *The Cyborg Handbook* (1995): 75-82.
[15] Halacy, (1965). *Cyborg: Evolution of the Superman*. Harper & Row Publishers.
[16] Moser, & Law, (2001). Cyborgs. In: N. J. Smelser, P. B. Baltes (Eds.), *International Encyclopedia of the Social and Behavioral Sciences,* 3202–3204.

To understand the Transhumanist perspective, they must know their fundamental anthropological hypotheses. The scientific and technical progress of the last three decades has generated three main theories on the nature of the human being. The first stipulates that it is impossible to define human beings according to what we "are" as nothing like what was called "human nature" for so long actually exists.[17] Also, human beings are defined by what they lack instead of by what they have.[18] While human beings were formerly perceived as endowed with life, spirit, and reason, Transhumanism defines them as possessing bodily and intellectual limitations: they get tired and carried away by emotions; they age, lose their faculties, and die. As all these characteristics carry a negative undertone, we are persuaded by a moral obligation to change or eliminate them.[19] So, what was understood as normative becomes a deficiency.[20] This reassessment initiates a radical change; we can no longer speak of improvement; we must speak of transformation. Therefore, the enhanced human body could be transformed into a different species that is superior to the contemporary homo sapiens.

The second anthropological hypothesis requires reducing human intelligence to mere information processing. It is rooted in modernity, a period that heavily emphasized the rational sphere over any other human trait. Gradually, the rational sphere was reduced to the psychological sphere, which, in turn, became considered a flow of information. This is when what we considered essentially human ceased to be exclusively associated with the subject; instead, it became transferable and shareable with other entities.[21] In turn, one of the human being's most important traits —intelligence— was reduced to data processing. This transformation triggered a research and development boom surrounding the study of AI. As Hayles[22] and Rose have stated, developing cybernetics and biotechnology has radically modified our perception of human beings. Now, humans are seen as simply capable of processing data and providing answers; they thus become alienated by machines and computers. Also, some scholars have referred to human beings as "data made flesh".[23] Therefore, the last seemingly insurmountable thing is the question of consciousness: a human is mindful not only of his actions (thoughts, feelings, etc.) but also of what it means to be human and what is not.[24]

The third anthropological theory is concerned with the body itself. From the treatises of Vesalius, who considered the body as a factory, to La Mettrie's *Man the Machine*, we observe a progressive objectification of the body and its assimilation into a machine. There is also an evolution in its consideration that starts

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[17] Diéguez, *Transhumanismo: La búsqueda tecnológica del mejoramiento humano*.
[18] Kurzweil, & Grossman, *Fantastic Voyage: Live Long Enough to Live Forever*.
[19] Postigo, Transumanesimo e postumano: principi teorici e implicazioni bioetiche. *Medicina e Morale*, *2*, 267–282; Asla, On the Limits, Imperfections and Evils of the Human Condition. Biological Improvement from a Thomistic Perspective. *Scientia et Fides*, *7*(2), 77–95.
[20] De Asís, Transhumanism and Disability. In: M.H. Rioux, J. Viera, A. Buettgen & E. Zubrow. (Eds.) *Handbook of Disability,* 1-17.
[21] Chavarría, El posthumanismo y los cambios en la identidad humana. *Revista Reflexiones, 94*(1), 99-102.
[22] Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. University of Chicago Press; Rose, *The Politics of Life Itself, Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton University Press.
[23] Thacker, Data Made Flesh: Biotechnology and the Discourse of the Posthuman. *Cultural Critique*, 53, 72–97; Mitchell & Thurtle, *Data Made Flesh: Embodying Information*.
[24] Arana, J. (2022). Desafíos antropológicos del transhumanismo. *Pensamiento, 78*(298), 485-501.

from the admiration of the body-machine perfection to its being overcome by other machines. The notion of the organism is lost, as both the internal and external parts of the human are naively believed to be substituted.[25] Reduced to genetic information, the body is conceived as merely biological, limiting an imperfect instrumental container. Everything once considered immaterial is now interpreted as material, thus susceptible to being replaced. Since stored data is sovereign and transferable between machines, many assume it should also be possible to transfer it to humans. By knowing how the mind works, we could transfer our data to other media. Also, this entails disembodiment, dematerialization, and estrangement of the body.[26] Reduced to mere genetic information, the body is conceived as a biological and natural frame, an imperfect yet instrumental container. Therefore, the door is open to its abandonment and redesign. In the Twentieth century, authors such as Merleau-Ponty[27] and Foucault[28] proposed theories about body transformations and their possibilities. Although neither directly proposed transforming the nature of the human species, their theories served as the basis for subsequent Posthumanist arguments.

In the 1960s, Posthumanism started to see as an offshoot or variant of transhumanism, although there is to clarify their differences. Both are heirs to a reduced vision of the human being, like the one we have alluded to. And for that reason, both promote the moral obligation and desirability to enhance human beings through technology.[29] Human beings' alleged improvement and development to reach their maximum potential could be attained only by transforming humans into different species.[30] Although similar, Transhumanism and Posthumanism differ in their roots and implementation. As Francesca Ferrando stated on several occasions, while Transhumanism reverts to its origins in the Enlightenment and Humanism, Posthumanism "was actually generated from the postmodern critic of Humanism and radical deconstruction of the 'Human'".[31] Even though Posthumanism and Transhumanism share a common interest in technology, they differ in their respective approaches. On the one hand, Transhumanism defends the use of technology to enhance humans on the premise that all further progress should benefit humanity. On the other hand, Posthumanism understands technology from Michel Foucault's perspective, namely as the concept of technology of the self. With this concept, Foucault sought to eliminate the differences forming dichotomies (self/others, woman/man, etc.). His archeology became a new ontology not only by way of deconstructing the notion of the human but also the notions of gender, animal, machine, and nature.[32] Ferrando argues that Foucault's approach aimed to break "dualism or antithesis, demystifying any ontological polarization through the postmodern practice of deconstruction".[33] This is why the cyborg

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[25] Le Breton, *L'adieu au corps.*
[26] Hayles, *How We Became Posthuman,* 3.
[27] Merleau-Ponty, *Phénoménologie de la perception.*, 176.
[28] Foucault, On the Genealogy of Ethics. In H. L. Deyfus & Rabinow, P. *Michel Foucault: Beyond Structuralism and Hermeneutics*, 236.
[29] Chapman, & Frankel, *Designing Our Descendants. The Promises and Perils of Genetic Modifications*. The John Hopkins University Press; Savulescu, "New Breeds of Humans: The Moral obligation to Enhance". *Reproductive Biomedicine Online, 10*(1), 36-39 and Savulescu, "The Moral Obligation to Create Children with the Best Chance of the Best Life". *Bioethics, 23*(5), 274–290.
[30] Kurzweil, *The Singularity is Near: When Humans Transcend Biology*. Viking.
[31] Ferrando, The Body. *Post- and Transhumanism: An Introduction.* Ranisch, R. & Sorgner, S.L. (Eds.), Peter Lang Publisher, 219.
[32] Lundblad, "Animality/ Posthumanism/ Disability: An Introduction." *New Literary History*, *51*(4).
[33]Ferrando, FPosthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms:

theorist Donna Haraway[34] and the famous feminist theorist Rosi Braidotti[35] rooted their cyborg ontology framework in Foucault's approach.[36]

In the wake of Foucauldian and Marxist post-structuralism accounts, Haraway interpreted social issues as an intrinsic element of the development of technology, thus becoming one of the leading representatives of Posthumanism. The cyborg was born as a subversive element within these power structures. However, Haraway is hopeful about the notion of the cyborg that she advances to resistance and subversion of the current power structures and perhaps even constructs a world in which new power structures are less alienating and oppressive. The cyborg deconstructs the body as an entity by generating a series of dichotomic amalgams defined as organic/technical, myth/reality, fiction/non-fiction. These fusions of contraries make the cyborg a hybrid creature that is exempted from the traditional understanding of the human species.[37] Haraway argues that the cyborg goes beyond binary dichotomies and genders; she defines it as a body that resists hetero-patriarchal societies. Its redesigned body is transformed into a means of social vindication that subverts the androcentric context and challenges society (Duarte & Park 2014, 261).[38] Because of this, it is positioned in such a way that it promotes a subversion and resistance that ignites from within rather than from beyond itself.

With Haraway's anthropological theory, the cyborg was no longer exclusive to the astronomical world and science fiction literature; it became achievable. Haraway used the image and concept of the cyborg to present a new being free from any power structure because it blurs the boundaries between the organic and the technical, the mythical and the real, and the fictional and the real. It is a hybrid being that is not subjected to the traditional understanding of the human species and, therefore, can be presented as an effective way to reach freedom.[39] In this context, human biology becomes moldable according to each person's preferences. Nevertheless, the bodily modifications are no longer considered external or exogenous, as were the prostheses or from a Foucauldian perspective; instead, they are now endogenous since biotechnology progress made possible their total integration, both when it comes to modifying the organic body and when it becomes a hybrid with the machine. The redesign of the body is thus transformed into a means of social vindication that subverts the androcentric context. Not only was this theory fundamental to the 1990s development of gender theories but also it was influential in the anthropology of new interspecies. Consequently, some scholars consider Haraway's anthropological theory to be very

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Differences and Relations. *Existenz* 8/2, 29.

[34] Haraway, A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century. *Socialist Review, 80*, 65–108. Reprinted as A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century. In Haraway, *Simians, Cyborgs, and Women* (pp. 149-182). Routledge.

[35] Braidotti, & Lykke, Posthuman, All Too Human: Towards a New Process Ontology. *Theory, Culture & Society*, *23*(7–8), 197–208; Braidotti, R. & N. Lykke (Eds.). (2013). *The Posthuman.* Polity Press.

[36] Lynes, Cyborgs and Virtual Bodies. In L. Disch, M. Hawkesworth (Eds.), *The Oxford Handbook of Feminist Theory.* Oxford University Press.

[37] Haraway, *Simians, Cyborgs, and Women,* 149.

[38] Duarte & Park, Body, Technology and Society: A Dance of Encounters. *Nanoethics, 8*, 261.

[39] Haraway, *Simians, Cyborgs, and Women,* 157-160.

challenging,[40] while others question its conclusions.[41]

The cyborg aesthetic of the 1980s was embodied in the cyberpunk aesthetic of the time and science fiction movies like *The Terminator* and *RoboCop*. This type of aesthetic exalts technology while displaying the degradation it generates by focusing on material progress while forgetting the human perspective. For instance, in the aforementioned movies, highly technological cities appear soiled and morally degraded. When technology is concerned with the body, the emphasis is on the difference between the natural, which is sometimes mutilated, and the mechanical. Haraway's cyborg also shares these characteristics, with some divergences since hers is non-gendered, the pioneer of its kind. Lynn Randolph's painting, *Cyborg* (1989) —which was printed in her book *Simians, Cyborgs and Women*—depicts a female figure with her hands on a keyboard and a feline on her head. Behind her is a monitor with different images of the universe. This painting could be understood as the female cyborg by freeing herself from dichotomies, harmoniously merging with nature and technology.[42] In this example, not only does the hybridization of the cyborg minimize the impact that technology has on the body, but also it does not hide the body.

The second paradigm shift is also concerned with the widespread development of cyborgism associated with the Grinder movement.[43] Sharing connections with Posthumanism and cyberpunk, this movement encouraged a "do-it-yourself" technological approach. Albeit involving numerous health risks, followers of this movement would hack their bodies in the hope of improving them. In many cases, these body alterations are done clandestinely, while some bypass ethical regulations regarding medical interventions.[44] Some of the Grinder movement adherents would distinguish themselves as the "New Flesh" movement. Some would transform their bodies without defining themselves as cyborgs, while others would identify themselves as such. Well-known among the former are Orlan and Sterlac. Orlan used his body as an ideological tool to break down the canons of beauty associated with femininity. Considering her body as ready-made, she held numerous performances in which she underwent a series of surgeries between 1990 and 1993. Her interventions led to the so-called Carnal Art. [45] Also, convinced that his body was imperfect and poorly designed, Sterlac attempted to improve it through the use of technology and virtual systems; he created Cybernetic Body Art.[46] In 1982, he launched a project entitled "The Third Hand," through which he had a third arm attached to his body and wrote the word "evolution" with it as a claim of how humans can improve through technology.[47]

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[40] Duarte & Park, "Body, Technology and Society: A Dance of Encounters", 261.
[41] Geertsema, "Cyborg: Myth or Reality?", *Zygon. Journal of Religion and Science, 41*(2), 289-328.
[42] Lozano, "El cíborg en disputa. Un análisis desde la estética tecnológica", *Argumentos de razón técnica*, 21, 157-172.
[43] Barfield, "The Process of Evolution, Human Enhancement, Technology, and Cyborg", *Philosophies, 4*(10), 2.
[44] DeGrazia, "Enhancement Technologies and Human Identity", *Journal of Medicine and Philosophy,* 30, 261–283.
[45] Karakuyu, "Cyborg Formations in Art," *IJournals: International Journal of Social Relevance & Concern*, *4*(8), 16.
[46] Karakuyu, "Cyborg Formations in Art," 12-15.
[47] Clarke, The Human/Not Human in the Work of Orlan and Stelarc. In Zylinska, J., *Cyborg Experiments. The Extensions of the Body in the Media Age,* 33-55.

Another of the most recognizable figures in this epoch is the British scientist Kevin Warwick, one of its pioneers. In 1998, he hacked his own body by implanting a silicon chip. In 2002, under the title "Cyborg Project," this University of Reading professor received a series of 100 electrodes fired into his nervous system to connect him to the Internet to research the possibilities for improvement. Through these electrodes, he successfully performed a series of experiments that included melding his nervous system with the Internet to control a robotic hand in the form of extended sensory input. Subsequently, he researched the possibilities of ultrasound for remotely detecting the distance of objects. Finally, with electrodes implanted in his wife's nervous system, they performed the first direct electronic communication experiment between two human nervous systems. Warwick claims that the information age has allowed us to shake off the traditional fragile human condition and that a redesign is in order.[48] Since the fusion of our bodies with technology is already a reality, why not change more and more parts so that we can live longer and better? In this view, technological modification should be applied to people who want it rather than to persons with diseases, becoming a means of social distinction.

Natasha Vita-More is among the most prominent transhumanist theorists. She is sensitive to the fact that art and design have always modified the human figure and affirmed that new technologies open up new possibilities for radical change. As evidenced on her website, she has been working for years on improving bodily redesign. The prototype she worked on was "Primo Posthuman" (1996), later expanded and improved upon with "Platform Diverse Body" and "Substrate Autonomous Persons" (2013). As the Executive Director of Humanity+, her latest project was "Project Innovator: Future Body Design" (2018). In this case, the improvements introduced in the body involve amplifying the senses, cognitive enrichment, the possibility of changing gender, and longevity.[49] These changes do not just signify improvements to current bodies; they are part of research that seeks to transform bodies, improve, or transcend them because everything in the body can be changed. Despite the emphasis on design and aesthetics, it is interesting that Vita-More's projects do not hide their technological or mechanical aspect. Her maintenance of a mechanical appearance evidences her attempt to break down the dogma of the body's sacredness. This is not only a provocation; it is a claim: wearing technology into the body meant in the past something negative, so people tried to hide it. However, today it can be seen as a positive symbol of enhancement or prestige. This idea is precisely why body transformations have been normalized and extended, as seen in the following section.

3. Third Paradigm Shift: From Enhancement to Cyborgization

Enhancing became an end, as evidenced by increased cosmetic surgery and hacking bodies through technology in advanced societies. However, those transformations were still external. Nowadays, we live

[48] Cerqui, & Warwick, Redesigning Humankind: The Rise of Cyborgs, a Desirable Goal? In P. E. Vermaas, P. Kroes, A. Light & S. A. Moore (Eds.), *Philosophy and Design. From Engineering to Architecture*, Springer, 188, 185-196.

[49] Vita-More, Aesthetics: Bringing Arts/Design into the Discussion of Transhumanism. In Vita-More, N. & More M. (Eds.), *The Transhumanist Reader: Classical and Contemporary Essays on Science, Technology, and Philosophy of the Human Future* (18-27). Wiley-Blackwell, 18-27.

in a significant acceleration and complexity of the mechanization of the body thanks to wearable technology. Their use is so widespread that most people use them not for medical reasons but because they understand that wearing them improves their lives. Most people do not confuse these devices with their bodies but live complex and hybrid relationships with technology in their everyday life. Wearable devices were constructed to be worn close to the skin to detect and transmit data and provide immediate biofeedback to the user. The promise of this efficiency suggests considering applying them to the human body's interior. However, the more intern the application, the greater the transformation. Up to here, the application of technology to the body had blurred the frontiers between able-bodied, disabled, and enhanced. As we will see here, this third paradigm shift will open the way to transform the concept of the human being. Introducing technology into the body will make them feel other than human; they will become cyborgs.

It has become possible to combine bionic elements with biotechnology products that finally become integrated into human bodies.[50] As we said before, the more intern incorporated, the greater the transformation. This hybridization raises hundreds of questions about what being human means regarding ontological, anthropological, and personal identity. Among philosophers, it is possible to find four positions: 1) the human dignity defenders, who base their arguments on human nature or essence, as Fukuyama or Habermas; 2) the techno skeptics, who do not believe that technology could change humanity, although they do not have a metaphysical argument, as Diéguez; 3) the radical Posthumanists, who do not believe in human nature and defend any possibility of transformation, as Julian Savulescu; 4) the critical Posthumanists, who are not against of the theory, but claim the necessity of to be conscious of the limits of their discourse or the problems of theory's effects, as Nick Bostrom, Peter Singer o Samantha Clayman.

While philosophers are trying to structure some answers, many people consider themselves cyborgs because they wear technology into their bodies. While these ideas are spreading through science fiction, a significant group of artists are modifying their bodies to explore bodily limits, understanding the body as an interface with different possibilities and projecting new ways of being. In this sense, the contemporary artist not only "investigates and questions" the prosthetic body to constantly decipher it but to "reinvent it".[51] This group is really interesting for our purpose as they have no utilitarian purpose for applying this technology beyond artistic purposes. This is possible because the artistic field is understood as experimental and not subject to the same criteria as other types of improvement or therapeutic changes.[52] However, the application of technology in the artist that we will analyze focuses not only on the extension of the body but on the extension of their cognitive functions. This is a qualitative leap because it directly affects our conception of ourselves.

As said before, artists are testimonies of their society and reliable forerunners of the changes we will see.

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[50] Service, The Cyborg Era Begins. *Science*, *340,* 1162-1165; Mestres, & Vives-Rego, "Behind and Beyond of the Cyborgs and Robots Ideas and Realities: Some Techno-Scientific and Philosophical Hints". *Imagonautas: revista Interdisciplinaria sobre imaginarios sociales, 3*(2), 3-11.
[51] Portero, & Linares, "Cases of Contemporary Art as a Process of Cyborgization of Society", *Revista Teknokultura*, *10*(2), 395.
[52] Harris, *Enhancing Evolution: The Ethical Case for Making Better People.* Princeton University Press, 35-58.

So, by analyzing contemporary artists, we can see the last paradigm shift in the perception of the application of technology to the body because they are configuring the collective imagination of an era, projecting possible futures and showing the way toward them. After that, we will see some of the many associated problems by analyzing their practices. We will primarily address the ethical question in their cyborg practice of normalizing and beautifying aggressive encroachments in the body without paying attention to medical calls. Analyzing them will allow us to forecast where the future might take us regarding bodily changes if we continue down this path.

Among the contemporary artists who identify as cyborgs, it is worth talking about those who are part of the movement called by themselves cyborgism. The most famous member is Neil Harbisson, a Spanish artist born with achromatopsia, which limits his eyesight to a scale of grays. In 2004, he decided to implant a chip in his brain connected to an antenna protruding from his head to capture light waves, giving him a specifically alien appearance. In addition, the antenna is connected to the Internet and receives waves from different satellites. The information from the waves is transformed into sound, which is then associated with a color and allows him to "perceive visible and invisible colors." Although he initially aimed to restore a vision problem, Harbisson was not content with reaching normal parameters and decided to expand his senses to superhuman levels, thus being now able to capture infrared and ultraviolet waves.[53] This case stands out because Harbisson considers his antenna a part of his body, leading to extra-human notions: "[He] identifies himself both as a cyborg" (he feels he is technology), "and as a transspecies" (he no longer feels 100% human)." The heart of this new cyborg ontology is based on feelings. As Moya points out, it is not that Harbisson understands himself as a human who uses technology; instead, he understands himself as technology because he feels technology is a part of himself. At the same time, this identification as a cyborg went beyond the private sphere when he petitioned the English government to officially recognize him as a cyborg in 2004.[54] His struggle with identity recognition, which he finally achieved, led him to consider the importance of fighting for cyborg rights and helping anyone joining him, and he founded the Cyborg Foundation in 2010.

Moon Ribas partnered with Harbisson in the Cyborg Foundation. This artist is genuinely fascinating because she decided to incorporate technology into her body despite not having any physical problem, injury, or disability. Ribas voluntarily decided to extend her senses and acquire a non-human one, thus becoming a cyborg. Moon incorporated a seismic sensor in her feet that allows her to capture tremors. She uses this new sense in her percussion and dance pieces called "Waiting for Earthquakes" (2016). This new sense allows her to connect with the Earth, and honoring her artistic name, she also connects with lunar movements and moonquakes, extending her senses to the extraterrestrial level and generating an endogenous relationship with nature.[55] These artists argue for the possibility of extending the senses through technology to create "cyborg art." Harbisson and Ribas affirm that they do not intend to create a

[53] Else, "A Cyborg Makes Art Using Seventh Sense", *The New Scientist, 215*(2877): 50.
[54] Moya, "Posthumanism: Promise or Threat of Technoscience? Principles of Minimal Biopolitics", *BIOETHICS UPdate, 4*, 37.
[55] Almiron, & Boukhris, "The Connexion between Digital Body and the Universe". In S. Crabu, P. Giardullo, F. Miele, M. Turrini (Eds.), *Sociotechnical Environments: Proceedings of the 6th STS ITALIA CONFERENCE.* STS Italia Publishing, 204.

virtual reality but rather to expand reality to feel more deeply. The device gathers information, which the brain processes when appropriate. In this way, they seek to increase perception through tech innovations and blur bodily and perceptual limits by adding and "creating" "new senses."

Philosophers and lawyers are drawing attention to the dangers of these practices because a world of cyborgs is a world awash in data,[56] and data handling is very problematic. Heilinger compiles several exciting questions[57], such as: who bears responsibility in the event of harm resulting from using an AI system? How can AI systems be prevented from reflecting existing discrimination, biases, and social injustices based on their training data, thereby exacerbating them? In particular, the AI system has many dangers to security and privacy.[58] If this is true in general terms, we can also consider the danger it means for cyborgs, always connected and unprotected by the law. Also, it leads to thinking about the consequences of connecting humans' brains to the Internet, as proposed by projects like Neuralink.[59] Furthermore, it is distinctive of this new generation of cyborgs that they merge their bodies with technology and let data constantly impact and transform their bodies and minds. That is why cyborg proposals go beyond bodily changes and foray into personal identity.

There are likewise legal discussions on how to deal with the use of technology in human bodies. Wittes and Chong defend that rights are related to the dominion of humans over their bodies; thus, laws do not recognize cyborgs because they do not have that total dominion.[60] This adds up to the problems of considering technology as part of the human body. The European regulation 2017/745 insists that technological devices incorporated into the body should be considered prostheses, not part of the body. This protects individuals with such prostheses from defects in the incorporated technologies or medical malpractice, which could not be contemplated if they were considered indistinct elements of the body.[61] For this reason, a specific law for cyborgs is being developed, as well as a new discipline that could be called cyborgoethics.[62] They explore the reasons and consequences of the profound changes that cyborgism means to the conception of the self, and that could lead, in the long term, to change the understanding of humanity as we know it today.

The technology applied to their bodies is still violent, but despite the risks that all these changes entail, they try to give an impression of naturalness. We can describe the aesthetic appearance of this technological

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[56] Wittes, & Chong, Our Cyborg Future: Law and Policy Implications. *Brookings Center for Technology Innovation, 15.*

[57] Heilinger, "The Ethics of AI Ethics. A Constructive Critique", *Philosophy and Technology, 35*(61).

[58] Veliz, *Privacy is Power. Why and How You Should Take Back Control of Your Data.* Melville House Publishing.

[59] Sempreboni & Viganò, "Privacy, Security and Trust in the Internet of Neurons". In: Groß, T. & Viganò, L. (eds) *Socio-Technical Aspects in Security and Trust*. STAST 2020. Lecture Notes in Computer Science, vol. 12812. Springer, Cham.

[60] Wittes & Chong, "Our Cyborg Future," 3.

[61] Puig, "Cíborgs: el cuerpo humano, los dispositivos tecnológicos y la libertad", *Cuadernos Electrónicos de Filosofía del Derecho,* 40, 222.

[62] Čatić, & Greguric, *Kiborgoetika – presjecište ili poveznica bioetike i tehnoetike.* Zagreb: Faculty of Mechanical Engineering and Naval Architecture, Ministry of Science, Education and Sports of the Republic of Croatia; Greguric, I. (2014). Ethical Issues of Human Enhancement Technologies: Cyborg Technology as the Extension of Human Biology. *Journal of Information, Communication and Ethics in Society, 12*(2), 133-148.

incorporation as "polished" or "smooth" In Han terminology, Polished means that there is no distance from technology, be it either resistance or reflection, but only consumption and enjoyment.[63] In this way, these artists invite bigger incorporations of technology without paying attention to the negative aspects that it may entail, so this is not only a superficial but a dangerous approach. On the other hand, technology, for them, is not something externally applied to the body but something that becomes part of the body because the person feels it as part of the self. This vision is communicated as a liberation from our limitations and an expansion of our condition. However, in contrast to the appearance of liberation from limitations and absence of negativity, the cyborg can be considered as the greatest internalization of the disciplinary paradigm in the Foucauldian sense since, in fact, those who artificially improve their bodies seek to achieve levels of productivity that can even lead them to dispense with their humanity.[64]

This naïf techno-optimism can transform our view of ourselves as human beings without sufficiently considering the consequences thereof.[65] We just commented on some anthropological, medical, and legal consequences. Still, it is worth mentioning how far we are from everyone beyond the Western hemisphere having access to technology or fundamental medical advances significantly, which results in making continued social inequalities even more extreme. Today, social and economic differences, no matter how large, do not translate into differences among human beings as a species; we remain convinced that we are all equal beyond appearances and material possessions. However, that equality would vanish if we go beyond superficial improvements toward making changes at the biological or psychological levels. This vision is not only Utopian but naively dangerous. With all these warnings, we do not want to transmit a pessimistic vision of technology. Instead, we think it is crucial to promote a vision of holistic and responsible techno-optimism, which does not assume that technology will save humanity by itself or is sufficient for the good to prevail by itself. This modest form of techno-optimism, as Danaher promotes,[66] has a collective human agency at its heart and maintains that believing we have the power to create the right institutions for generating, selecting, and creating material technologies and acting on that belief cautiously and sensibly can make it more likely that the good will prevail over the bad.

4. Last remarks

This article has delved into the intricate relationship between technology and the human body over the course of the past century, exploring how these transformations have been received and perceived. During the World Wars, artists, driven by their visionary imaginations, began envisioning a new breed of humanity integrated with technology. Although it was only an experiment, help to normalize human-technology interaction. The turning point came in the 1960s when space experiments showcased the potential for technological applications to enhance human capabilities, initially in hostile environments but eventually for all individuals. A significant second paradigm shift occurred when the focus shifted from improving

[63] Han, *Saving Beauty,* 15-20.
[64] Han, *Saving Beauty,* 20-22.
[65] Jaller, "Cyborgism: Artistic Hybridizations of Human Perception", *BCS Learning and Development Ltd. Proceedings of EVA,* 1-3.
[66] Danaher, "Techno-optimism: An Analysis, an Evaluation and a Modest Defense", *Philosophy and Technology, 35*(54).

individuals without disabilities to embracing the concept of enhancement, fueled by the rise of Transhumanist and Posthumanist ideologies that even contemplated surpassing the limitations of the human species. In the 1980s, artists translated these theories into tangible experiments on their bodies, catalyzing these ideas' gradual dissemination throughout society.

That reflections help us understand that we find ourselves amid the third paradigm shift, characterized by the pervasive cyborgization of society, facilitated by the normalization of technology in our everyday lives. Within this paradigm, we tried to analyze Cyborg artists to see a step beyond our current situation. For them, incorporating technology into their very essence means transcending conventional human identity. Though they constitute a minority, their endeavors raise pertinent questions about the use of data, its integration into our bodies, and its far-reaching consequences, challenging us to confront the impending future and reflect upon whether it aligns with our desired trajectory.

This article illuminates the multifaceted implications of this ongoing transformation by examining the historical evolution of human-technology integration, considering the relevant art's role in the acceptance of the incorporation of technology in our bodies. In an era where the boundaries between humans and machines continue to blur, it is imperative that we engage in thoughtful reflection and deliberate discourse to shape a future that aligns with our values and aspirations.

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