ELOPE

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Prostheses, Cyborgs and Cyberspace – the Cyberpunk Trinity

Summary

This article will explore three elements that have collectively become the *sine qua non* of our lives: prostheses, cyborgs and cyberspace. The main concern of the article is to show the close connection between the technology-saturated reality of today and the literature of cyberpunk as the prototypical representative of merging the human and the technological. This will enable us to explore the interaction between literature and reality in the formation of the cyborg of today.

Key words: prostheses, cyberspace, cyborg, cyberpunk, literature

Proteze, kiborgi in kiberprostor – kiberpankovska trojica

Povzetek

V članku bom raziskovala tri elemente, ki zaznamujejo naše današnje življenje: proteze, kiborgi in kiberprostor. Osrednja tema je pokazati povezavo med s tehnologijo prežeto realnostjo današnjega časa in literaturo kiberpanka, ki predstavlja prototip stapljanja človeka s tehnologijo. To nam bo omogočilo raziskavo interakcije med književnostjo in resničnostjo pri oblikovanju kiborga sedanjosti.

Ključne besede: proteze, kiberprostor, kiborg, kiberpank, literatura

Prostheses, Cyborgs and Cyberspace – the Cyberpunk Trinity

1. Introduction

Today we are surrounded by numerous technologies that span all levels of our lives. The hardware, the software and the growing speed of data transfer, all packed into the perpetually shrinking form of screens and keyboards, which create our daily reality, have gradually evolved into extensions of our bodies – they are our prostheses that define our lives as cyborgs in the world of cyberspace data streams surrounding us.[1] As N. Katherine Hayles explains in *How We Became Posthuman*, "information is increasingly perceived as interpenetrating material forms" (Hayles 1999, 19). On the one hand, this leads to our increasing dependence on electronic devices, which have become a part of us to such a degree that we feel lost without them. On the other hand, the only way we can access the information streams that are shaping our daily lives is through the use of electronic technology. It can be concluded that technology functions as prosthetics for us, enabling us the navigation through the cyberspace data worlds of today.

This article will explore the relationship between the three elements that define our symbiosis with technology today: prostheses, cyborgs and cyberspace. The analysis of these three elements will encompass two aspects. The first aspect is reality: we will concentrate mainly on the development of technology and how this has shaped the human being. The second aspect is literature. Here we will concentrate on the literature of cyberpunk, since this literature is the symbol of portraying the merging of humans with technology. Another reason for the importance of cyberpunk is its gradual transformation into the reality of today. Many technologies, such as virtual reality and the Internet, which were still fiction at the time cyberpunk was written, are nowadays real and available to the average human. The analysis of prostheses, cyborgs and cyberspace will be based on the thesis that there is a close connection between reality and cyberpunk literature when it comes to these three elements. While at the beginning the development of real-life technology inspired cyberpunk works, today it could be said that reality is inspired by cyberpunk fictional technologies. The analysis of real-life prostheses, cyberspace and cyborgs will therefore serve as the basis for the analysis of these three elements in cyberpunk literature. My intention in this article is three-fold. First, I will show how the development of new technologies shapes the definition of prostheses, cyborgs and cyberspace. The second question I will address is how the rapidly developing technologies produce new types of cyborgs over time. Finally, cyborg development in cyberpunk literature and in real life will be explored and the mutual influences between both realms will be shown. The purpose of this research is to explore the way literature and reality interact in the formation of the cyborg. However, before an explanation of the relationship between the prostheses, the cyborg and the cyberspace can be made, a brief survey of the three terms prosthesis, cyborg and cyberspace is needed.

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[1] Already in 1981 Jean Baudrillard focused on the correlation between the concept of people and information in his work *Simulacra and Simulation*. The fractal subject was his term denoting the postmodern man who is constantly bombarded with information, which, in turn, shapes his identity. However, the fact that information is being published in a vast quantity of media has led to a stage where the original information has been lost and only copies remain. Baudrillard calls these copies simulacra. "Originals do not exist any more. People recognize simulations as reality. They have come to recognize the simulacra as something more real than the reality itself – a phenomenon which is referred to by Baudrillard as the 'hyperreal' (1)" (Sever 2010, 27). Cyborgs in the world of cyberspace data streams are essentially Baudrillard's fractal subjects in the age of computer technologies and the Internet.

2. Prostheses / cyborgs / cyberspace

In their Introduction to *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future* Marquard Smith and Joanne Morra explain that the word prosthesis gained its medical meaning (i.e., replacing missing body parts with artificial ones) already in 1704. Eventually, the word gained additional meanings of extension, augmentation and enhancement and started to be used in contexts describing the relations between the human body and technology in general. The appearance of the cyborg in the 1980s and 1990s, Donna Harraway's essay "The Cyborg Manifesto: Science, Technology, and Socialist Feminism in the 1980's", and rapid technological development at the end of the 20th century quickly led to "an epic status" (Smith and Morra 2006, 2) of prosthesis. It can be concluded that, in connection to the human body, the meaning of the word prosthesis has grown over time from the very basic meaning that encompassed simple artificial limbs to the very complex meaning of today, when essentially all technology that we employ in our daily lives can be defined as prosthetic.

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The second element is the cyborg. The birth of the term itself is, in my view, best explained by Manfred Clynes[2] in "An Interview with Manfred Clynes" by Chris Hables Gray, which was published in *The Cyborg Handbook*. Clynes explains that, as a result of his work with Nathan Kline in the 1960s, a new concept was born, "a concept of persons who can free themselves from the constraints of the environment to the extent that they wished. [...] The main idea was to liberate man from the constraints as he flies into space..." (Gray 1995, 47) Clynes invented the word cyborg to denote that new existence of man. With the rapid development of technology, however, cyborgs soon became "a central figure of the late Twentieth Century" (ibid., 2), as Chris Hables Gray, Steven Mentor and Heidi J. Figueroa-Sarriera explain in their introduction to *The Cyborg Handbook*, titled "Cyborgology: Constructing the Knowledge of Cybernetic Organisms". Gray, Mentor and Figueroa-Sarriera also summarize Donna Haraway: while the concept of the cyborg helps us understand the postmodern era, it is still difficult to determine the various types of cyborgs since their number is still growing. We can conclude with the words of Gray, Mentor and Figueroa-Sarriera that "we certainly live in a 'cyborg society.' Machines are intimately interfaced with humans on almost every level of existence not only in the West and Japan but among the elite in every country in the world" (ibid., 3).

To summarize, the term cyborg today denotes the interaction and augmentation of humans with machines and technology on various levels of life. While initially invented as a specialized term by Clynes, the term has spread into literature and real life. The two realms are now slowly merging due to the rapid development of technology. In fact, as Ray Kurzweil predicts in his *The Singularity Is Near*, the development of information technologies will be so fast in the next few decades that our technologies will rapidly surpass our own biological capabilities.

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Lastly, let us take a look at cyberspace. A very useful explanation can be found in the essay by William R. Macauley and Angel J. Gordo-Lopez "From Cognitive Psychologies to Mythologies", published in *The Cyborg Handbook*[3]:

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[2]   It is important to understand the surroundings that led to the invention of the term cyborg. Since Manfred Clynes invented the word 'cyborg', his explanation shows the original meaning the term denoted.

[3]   Macauley's and Gordo-Lopez's definition was chosen here simply because it offers a general description of cyberspace, which can then be employed in further analyses of cyberspace in literature as well as in real life.

[...] the relationship between humans and information has changed profoundly during the late 20th century; increased accessibility and an explosion in the quantity and quality of information made available to individuals requires new strategies and models to cope with these changes... The introduction of novel computer technology – head mounted displays (HDMs) and 6 degrees of freedom (6DOF) peripheral devices, for example – provides an electronic medium in which HCI [human-computer interaction] is replaced by the fusion of human with computer. This medium has been labelled *cyberspace* (Gibson 1984; Benedikt 1991) or *virtual reality* (VR) (Lanier 1989; Brooks 1988). Cyberspace can be employed to fashion real or novel environments which the participant perceives directly and navigates through. [...] Cyberspace is a medium which envelops and, simultaneously, reconstitutes the techno-social body in a virtual discursive space. (Gray 1995, 436)

As can be seen from the above explanation, what lies at the heart of cyberspace is information, which is the basic aspect of cyberspace used in this article.[4]

3. The linking of the three elements

Before we continue, let us quickly sum up the above explanations in a few points relevant to this article. Firstly, prosthesis is no longer a term defining merely artificial limbs, but a term denoting the relationship between humans and machines in general. Secondly, the cyborg can be defined as a mechanically improved or enhanced human being that is practically merged with technology on multiple levels of his existence, from private to public, from physical to psychological. Finally, cyberspace is essentially information which everyone can access, manipulate and contribute to. These are the three basic points on which the rest of this article will be based.

Even though cyborgs are usually linked to the existence of cyberspace, they are not, in fact, connected. Although the word 'cyborg' itself was invented only in the second half of the twentieth century, cyborgs actually precede cyberspace. What enabled the existence of the very first cyborgs was, in fact, the emergence of prosthetics. Similar to contemporary cyborg technologies, the first prosthetic devices that were invented already in the second half of the nineteenth century had a military background. They were prosthetic limbs for wounded soldiers. Jennifer Davis McDaid's essay "'How a One-Legged Rebel Lives': Confederate Veterans and Artificial Limbs in Virginia", published in the book *Artificial Parts, Practical Lives: Modern Histories of Prosthetics*, explains how in those early days the common belief among amputees was that prostheses were impractical and not particularly useful, since the prosthetic limbs were "noisy, uncomfortable, and cumbersome" (Ott, Serlin, and Mihm 2002, 122). It was not until after the Second World War that the development of prosthetic limbs got a new boost. As David Serlin explains in his essay "Engineering Masculinity: Veterans and Prosthetics after World War Two", also published in the book *Artificial Parts, Practical Lives*, the development of prostheses benefited immensely from the invention of novel materials for military needs and purposes.

Even those early prostheses wearers may be considered as cyborgs due to the fact that the first prostheses already represented the joining of the human body with technology. However, these first cyborgs were not so much improved as merely returned to normality. The prostheses they wore were purposefully made to serve a particular function, which enabled the amputees to lead a more or less normal daily life or earn a living. Those days could be defined as the age of the wearable prostheses.

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4   This article deals with the general classification of prostheses, cyberspace and cyborgs. For the purposes of such a classification it is sufficient to apply a broader concept underlying cyberspace: information.

With the advent of computer technology in the second half of the twentieth century things changed. Cyberspace was born. The opening words of David Hakken's book *Cyborgs@Cyberspace: An Ethnographer Looks to the Future* give a nice view of the changes that cyberspace brought about:

> Computer theorists use the term "cyberspace" to refer to the national social arena we "enter" when using computers to communicate. "Cyberspace" can be used more generally to refer to the potential "lifeway" or general type of culture being created via Advanced Information Technology (AIT), the congeries of artefacts, practices, and relationships coming together around computing. (Hakken 1999, 1)

As can be clearly seen from Hakken's explanation, cyberspace is perceived as an environment "inside" computers, which is created by computer networks and information highways. This is the way people usually understand cyberspace – it is cyberspace in its traditional form.

The era of computers also saw the birth of the term 'cyborg', as has already been explained above. With the spreading of computer networks and the growing number of computer users, and especially with cyberpunk literature in the 1980s, the word 'cyborg' soon gained a new meaning. It started to denote an organism that is connected to datastreams and information highways of the computer networks. For such a creature, cyberspace became a necessary lifeline – a prosthesis. Cyborgs became data-conditioned creatures that did not necessarily lack body parts, but nevertheless used the prosthesis of cyberspace. However, because cyberspace is not so much worn as it is inhabited, it can be said that this is the age of inhabitable or liveable prostheses.

Finally, the end of the twentieth century and the beginning of the twenty-first century saw another phenomenon, which may be defined as the spilling of cyberspace. When the computer finally gained its present form and status of a household gadget, it lost some of its exotic aura of an all-powerful machine, since it turned out to be just another information tool. However, while information technologies were strongly present in people's lives already before the computer, they were analogue. Newspapers, magazines, the radio, the television – all of these were channels of information, but they were controlled and somehow static. People could not contribute, edit, create or manipulate their contents at will.

It was the computer – essentially still just another information tool – that brought about two upgrades to the former information technologies: contribution and digitalization. With the computer becoming a household appliance and with the growing of computer networks supported by high-speed connections, anyone could obtain their own little place in cyberspace. People could upload and download data freely, they could manipulate them, create them, delete them. With computers becoming ever smaller, lighter, cheaper, and, at the same time, more and more powerful, people now have access to advanced technologies which were hitherto chiefly reserved for the world of cyberpunk novels.

However, as it turns out, the computer served merely as the base for new digital technologies. Computer chips, circuit boards and other components are nowadays omnipresent and can be found on all levels of our daily lives, from highly sophisticated medical technologies (prostheses, pacemakers, life-support equipment, etc.) to the simplest of our kitchen appliances (microwaves, coffee makers, etc.), from heavy machinery that is used to build our cities to the smallest devices (such as mobile phones) that we are practically glued to every day.

It can be concluded that digitalization is the process that caused the spilling of cyberspace from

behind computer screens into the real world. Today, we are continuously bombarded with information. From the most obvious of the media, such as the radio and the television, which are nowadays digitalized, as well, to our home PCs, laptops and tablets, from the giant electronic billboards (the most obvious example of which loom over the streets of Tokyo) to our mobile phones – all of these things surround us and cause our complete immersion in information. We are saturated with pixels and megabytes of information everywhere we turn. Digitalization has also changed the wearable prostheses of the previous era. Prosthetic limbs have become more versatile, efficient and sophisticated already to the point where they not only return amputees to normalcy but actually improve their physical bodies (for example, specialized prosthetic legs can be set to the size of the step, which enables the wearer to run in giant leaps).

We can no longer imagine our lives without our little electronic gadgets.[5] Taking away our connections to the streams of data equals death to us.[6] It can be concluded that these technologies are our prostheses, which, through the process of digitalization, have become ubiquitous.

4. The three stages of development

The analysis of prostheses therefore leads us to the conclusion that cyborgs and cyberspace develop in three stages. The first stage is the stage of the wearable prostheses, which leads to the birth of the so-called analogue cyborgs. The crucial characteristic of these cyborgs is that they had to be missing one or more limbs in order to wear a prosthesis. The second stage is the stage of the inhabitable or liveable prostheses, which create digital cyborgs. These cyborgs only need to sit down in front of the computer in order to be prosthetically enhanced. The third stage is the stage of the all-encountering prostheses, which gives birth to the all-encompassing cyborgs. These cyborgs only need to be born to be immersed in digitalization and its prostheses. Already babies in hospitals are subjects to various tests and check-ups, which include medical (information) technology. As children grow up and become adults, this immersion is only increased by various forms of media that constantly surround them. In fact, in *The Singularity Is Near*, Ray Kurzweil predicts that the near future will bring about not just immersion, but complete merging of humans with technology. He calls this period Singularity: "What, then, is the Singularity? It's a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed. [...] There will be no distinction, post-Singularity, between human and machine or between physical and virtual reality" (Kurzweil 2005, Locations 483, 532). Kurzweil

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[5]   In David Bell and Barbara M. Kennedy's book *The Cybercultures Reader (Second Edition)* we can find the essay by Todd Joseph Miles Holden and Takako Tsuruki: "DEAI-KEI Japan's new culture of encounter". The authors deal with the current culture of Internet forums in Japan. They explain that mobile phones with Internet capabilities quickly became the preferred platform for Internet use among the Japanese. This portable Internet also enabled people to access *deai* (i.e., Internet forums) with intention to meet people with similar interests online. Only a small percentage of *deai* users actually met their new acquaintances in person. "[I]nteraction via machine was far more common than in-the-flesh meetings arranged through *deai*" (Bell and Kennedy 2007, 146). It can be concluded that our dependence on electronic devices has grown to the point that we need them even for things as basic as meeting new people.

[6]   In *Death and Mass Media in the World of Don DeLillo's White Noise and Cosmopolis* I explain the role of the Internet in the context of Baudrillard's theory of the fractal subject. The identity of the postmodern man as a fractal subject is formed through the absorption of information from the world around him. The Internet has simplified this since all the information is available instantly with a few clicks. As Mojca Krevel explains, the Internet, with its chief representative form of the hypertext, also represents the embodiment of the principle behind the fractal subject, which is choosing or discarding information in order to shape one's identity (Krevel 2003, 334).
Today, the Internet represents the central data stream to us. If we lose our connection to this constantly growing quantity of data, we lose our chief supply of identity building blocks, which means we practically stop existing as postmodern fractal subjects. This equals death of the postmodern man as the fractal subject.

predicts that, eventually, nanobots[7] will enhance the human experience by creating "virtual reality from within the nervous system" (Kurzweil 2005, Location 867).

Prostheses, cyborgs and cyberspace need to be redefined with the development of new technologies over time. The roles of preconditioning have changed, as well. At first, it was the prostheses that preconditioned the existence of the cyborg. Later, cyberspace preconditioned the existence of the cyborg. Nowadays, life itself preconditions the existence of cyborgs.

Today, cyberspace is everywhere, with or without its most typical mark of the screen (e.g., pacemakers contain chips and electronic compounds that are basically data without a screen). With the spilling of cyberspace, we have all become cyborgs. While at first cyborgs predated cyberspace as we know it now, today cyberspace preconditions us all as cyborgs.

5. Cyberpunk

How does all this connect to literature, more precisely, to the 1980s literature of cyberpunk? While based on the computer technology and the information networks of its time, in many respects cyberpunk literature surpasses the technology of the time by encompassing a number of highly sophisticated devices in its works. However, cyberpunk literary works actually include all forms of cyborg technologies that were classified in this article. First, there are the wearable prostheses. These usually have the same role in cyberpunk literary works as they have in real life: to return a person to a state of normalcy. One of the most obvious examples of characters featuring such a prosthetic piece is Ratz from William Gibson's novel *Neuromancer*. Compared to the sophisticated technology that is available in the world of *Neuromancer*, Ratz's prosthetic arm looks ugly, primitive and clumsy, yet it is an element that makes the novel's environment seem more down-to-earth and realistic. Another telling example is Maxwell from Matt Ruff's novel *Sewer, Gas and Electric: The Public Works Trilogy*, who is the proud owner of a prosthetic leg, a prosthetic toe and a prosthetic scrotum. Again, these prosthetic additions to his body are meant merely to enable him a return to a normal life.

However, the wearable prostheses also go one step further from the real-life prostheses. Molly from *Neuromancer*, for example, has inbuilt lenses in front of her eyes and claws built into her fingertips. Allie from Pat Cadigan's *Mindplayers* is another example. Due to the nature of her work she has her natural eyes exchanged with artificial ones. While they can still be categorized as wearable prostheses, these bodily additions do much more than just return these characters to a state of normalcy. They actually improve and upgrade their bodies and enable them to do more-than-merely-human things at their own free will. This is where cyberpunk overtakes reality.

Although, as has been established, cyberpunk literature takes the wearable prostheses to a more advanced level, it also paradoxically stresses the importance of the fallible human body. For example, in Matt Ruff's, *Sewer, Gas and Electric* we can find characters who are missing their limbs and other parts of their bodies, but at the same time the human DNA is one of the most sophisticated types of information. When a company produces a special nanovirus, it is taught "to read the DNA of

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7   Kurzweil defines nanobots as "small robots the size of human blood cells or smaller that can travel inside the bloodstream" (Kurzweil 2005, Location 5253) and explains that such micro-technology has already been used on animals quite successfully. In the future, nanobots will be able to scan the human brain "to facilitate its reverse engineering" (Kurzweil 2005, Location 5258). They will also be used in diagnostic and therapeutic purposes. As Kurzweil explains, Robert A. Freitas Jr. is a pioneer on the field of nanobots. He has already designed the concepts of "robotic replacements for human blood cells" (Kurzweil 2005, Location 5260): respirocytes for better oxygenation of the blood, microbivores for fighting pathogens, DNA-repair robots and other medical robots that will be able to clean up human cells. Such research is already underway and is progressing rapidly.

its host for skin color, hair texture, bone structure, and more subtle racial indicators like blood type and metabolic chemistry" (Ruff 1997, 294). It can be said that although the cyberpunk wearable prostheses are much more advanced than the wearable prostheses of reality; they are somehow unimportant. The body's real value is its DNA data and the brain, not the technological augmentations worn by their users.

Inhabitable prostheses are among the most widely spread prostheses in cyberpunk works. However, this is also where the difference between cyberpunk works and reality is the most obvious. In addition to the information Case and Molly from *Neuromancer* melt with, there is another good example of a character inhabiting the data networks: Hiro from Neal Stephenson's novel *Snow Crash*. Characters such as Case and Hiro represent the typical computer user of the twenty-first century: practically life-dependent on the streams of information, they spend most of their time immersed into the data networks. However, while the inhabitable prostheses of our real-life data networks nowadays still have to be accessed with the help of computers, routers, modems and cables, cyberpunk characters again go beyond this and plug into the datastreams through another piece of advanced wearable prostheses – plug-ins in their heads. They literally merge with information.

The inhabitable prostheses of data networks also come in two forms when it comes to cyberpunk. They can be the classical examples of information about corporations, etc., such as those surfed by Case. However, they can also be the data networks of the human mind. Allie from *Mindplayers* plugs into the depths of human minds through her eyesockets and then explores the human mind-data. This is another aspect where cyberpunk exceeds reality.

Inhabitable prostheses also lead to another phenomenon present in cyberpunk literature, which is not present in reality. The more advanced the inhabitable prostheses and their data networks are, the more natural it becomes for the characters to replace the biological components of their bodies with some type of a wearable prosthesis. Since the highest form of data in cyberpunk is still human DNA and the human brain, a good example of such replacing is Allie from Pat Cadigan's *Mindplayers*. When she becomes an employee of Nelson Nelson, he decides to rebuild her, starting by replacing her biological eyes with artificial ones: "The eyes I'm gonna give you Reattach to the muscles easier, not to mention the optic nerve, which I already mentioned" (Cadigan, 104). The human mind is accessed through the eye sockets, which requires removing the eyes first. Since Allie is a professional pathosfinder, she regularly hooks into people's minds through her eye sockets. Therefore she simply accepts Nelson Nelson's order of replacing her eyes as her new reality and immediately picks "cats-eye" (ibid., 106) biogem for her new wearable prosthesis. As can be seen, the human mind, which is the highest form of information network in *Mindplayers*, regulates the form of the physical human body. It is therefore natural to obtain a type of wearable prosthesis to be able to access the human mind-data network.

The all-encountering prostheses of the general data that surround us in the technology-saturated world that we live in today are also represented in cyberpunk. The best examples of this type of prostheses can be found in William Gibson's novels *Neuromancer*, *Mona Lisa Overdrive*, and *Count Zero*. The streets the characters walk on are practically swarming with information at every step. The cities glow in neon and resemble cyberspace when viewed from the air. In *Neuromancer*, for example, the Sprawl is described as being the matrix itself:

> Program a map to display frequency of data exchange, every thousand megabytes a single pixel on a very large screen. Manhattan and Atlanta burn solid white. Then they start to

pulse, the rate of traffic threatening to overload your simulation. Your map is about to go nova. Cool it down. Up your scale. Each pixel a million megabytes. At a hundred million megabytes per second, you begin to make out certain blocks in midtown Manhattan, outlines of hundred-year-old industrial parks ringing the old core of Atlanta [...]. (Gibson 1995, 57)

This is also probably the type of prosthesis that differs the least from the reality of today. One of the most obvious examples is Tokyo, which is described by William Gibson in his article "The Future Perfect: How did Japan become the favoured default setting for so many cyberpunk writers?": "I remember my first glimpse of Shibuya, when one of the young Tokyo journalists who had taken me there, his face drenched with the light of a thousand media-suns – all that towering, animated crawl of commercial information – said, 'You see? You see? It is Blade Runner town.' And it was. It so evidently was" (Gibson 2001).

It can be concluded that the three types of prostheses and hence the three types of cyborgs and cyberspace are well represented in reality and in cyberpunk works. The main question is, however, which precedes which in terms of the relation between cyberpunk and reality. The wearable prostheses in reality definitely well precede cyberpunk. Even cyberspace precedes cyberpunk with its origins, since computers and the first computer networks already existed in the days cyberpunk literature was written. However, cyberpunk does not merely include these technological environments in its works. It makes them into a whole new habitat for cyberspace cowboys and hackers. Finally, the information technology in its pixel-and-screen form of today only became widespread and popular after the time of cyberpunk.

However, one thing remains in which cyberpunk is the absolute predecessor: the true cyborg technology – the technology that improves the completely healthy human body and empowers it beyond its physical boundaries. Humans in the reality of today can still only access the vast quantities of data with a barrier of the screen between themselves and the data. While virtual reality is already known today, it is still very primitive in comparison to what cyberpunk characters have at their disposal. Full and complete immersion into data, melting with the data, as can be accomplished by cyberpunk characters, is still not possible in the reality of today. However, while we are still far away from the possibility of sticking a cable into our brain and be reborn in cyberspace, the beginnings of such a technology have already shocked the world. One such example is the work of Kevin Warwick, who experimented with implants and ways of data-control on his own body. We just have to wait for the cyberpunk enhancements to fully embrace us and expand our horizons as they come ...

6. Conclusion

While prosthetic technology started out purely as an addition to the disabled human body, it soon developed into an enhancement of the body (a good example of such a technology is the computer). Today, information technology surrounds us on every step and we can hardly imagine our existence without a constant input of data. This article has offered a rather general survey of the development of prostheses, cyborgs and cyberspace. Our intention was three-fold: to outline how the development of new technologies shapes the definition of prosthesis, cyberspace and cyborg, to show how the rapidly developing technologies produce new types of cyborgs over time, to show the development of the cyborg in real life and in cyberpunk literature and to point out the mutual influences between real life and cyberpunk literature. These three claims were confirmed by establishing the three stages of the development of technology and cyborgs in reality as well

as in literature. The wearable prostheses led to the birth of the analogue cyborgs. The inhabitable prostheses enabled the existence of the digital cyborgs. The all-encountering prostheses resulted in the creation of the all-encompassing cyborgs.

There is also Ray Kurzweil's concept of the future, which he calls singularity – a time when humans will merge with technology far more powerful than the existing human mind. This analysis of the three stages of prostheses and cyborgs together with Ray Kurzweil's predictions[8] leads us to the conclusion that technology is slowly taking over the human body. According to Kurzweil, the future will bring about the merging of powerful technology and the human organism. Read in this context, cyberpunk works sound like a very good prediction of the future, which also confirms our thesis that cyberpunk literature and reality are mutually connected. While at first the real-life technology served as an inspiration for the works of cyberpunk literature, today's reality is starting to resemble the data-saturated worlds explored in cyberpunk literature.

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[8]   Although many critics disagree with Kurzweil, the development in reality shows that Kurzweil's predictions are slowly entering our daily lives. Projects such as reverse engineering of the human brain and the use of nanobots in treatment of medical conditions are already under way.

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