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Theological and Ethical Aspects of Mind Transfer in Transhumanism

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Abstract. Mind transfer is the most important concept of transhumanists. Its technological implementation is to copy and transfer the human mind to a computer, by exact mapping of all neural connections in the human brain and their precise copying in a computer simulation. The idea of mind transfer also brings some dangers, related to the denial of human nature, the placing of hopes for future life in digital spaces and the liberation from the limitations imposed on man by his biological structure. Transhumanists believe that in order to achieve mind transfer, various technologies defined by the acronym NBIC (Nanotechnology, Biotechnology, Information Technology, Cognitive Science) currently available, should be used. The very dynamic development of these technologies in recent years, and in particular the latest AI (Artificial Intelligence) algorithms seem to be very fast approaching the moment when practical mind transfer will be possible. The paper contains a very brief description of these technical capabilities with the necessary short commentary on their ethical aspects.

Keywords: Neuroscience; transhumanism; artificial intelligence algorithms; anthropology.

Introduction

Issues relating to the transhumanism are increasingly being seriously discussed in the scientific community. Transhumanism is not a monolithic ideology, but it does have an official declaration and an organization[1]. The goal of the transhumanists is to cross the boundaries of human condition and create a posthuman. Since we are currently in an intermediate situation, between human and posthuman, the current human condition is defined by the prefix –trans, as transhuman. In order to achieve the goal of creating a posthuman being, transhumanists use various technologies called acronym NBIC: Nanotechnology, Biotechnology, Information Technology and Cognitive Science (Misra 2019). The use of such a variety of methods causes a lot of misunderstandings, related to the difficulty of a synthetic approach to different scientific disciplines. Discussing only one field, e.g. biotechnology, will not allow to fully understand the problem. However, a broader approach is extremely difficult because it requires knowledge of many different fields of modern science and technology. In this work, very difficult tasks will be undertaken, even a superficial reference to all the components of NBIC in order to describe the most important goal of transhumanists, which is mind uploading[2]. Oxford University's Future of Humanity Institute, a major transhumanist group, released a report of the technological requirements for uploading a mind to a machine (Sandberg 2008). The current approach to this problem is best reflected in the words of transhumanist Susan Schneider (Schneider 2020): "Our brains evolved for specific environments and are greatly constrained by anatomy and evolution. But artificial intelligence (AI) has opened up a vast design space, offering new materials and models of operation, as well as novel ways to explore the space at a rate much faster than biological evolution. I call this exciting new enterprise mind design. Mind design is a form of intelligent design,

[1] https://humanityplus.org/philosophy/transhumanist-declaration/ [access 25.03.2020].

[2] Mind uploading is also referred in the literature as: "mind transfer", "whole brain emulation" or "mind copying". In this work all these terms will be treated equally.

but we humans, not God, are the designers." So the latest technology that transhumanists have great hopes for is artificial intelligence technology.

Subjective and not subjective treatment of man is a typical feature presented more and more often in the scientific circles. Seeing science as a direct continuation of the idea of enlightenment, many contemporary scientists have turned the fundamental eschatological question "How can I be saved?" into the practical question "How can I be happy?" (Porter 2000). And it is in this convention that they consider the problems that may arise during the development of AI technology. The declaration creators only wonder what to do to make AI serve man and do not notice that it has an increasing influence on man in every possible dimension. The widespread use of AI algorithms in Internet technologies is gradually getting users used to their universal capabilities (Sloan 2019). The use of AI technology in the collection and analysis of Big Data sets of user data allows for global and effective marketing strategies (Davenport, 2020). Using AI in personalizing content in information channels can be used to manipulate entire social groups (Mogaji 2020). Cardinal Robert Sarah recognizes this situation very well and describes it in his book *The Day is Now Far Spent*. The Cardinal clearly indicates that in the hearts of the Westerners he sees rejection of the creative fatherhood of God. Although most often he refers the issue to the gender ideology, immediately afterwards he defines transhumanism as the last symbol of the God rejection. He writes "The West rejects the gift, agrees only to what it will create itself. Transhumanism is the last symbol of this movement. For the Westerners, even human nature, precisely because it is a gift from God, becomes unbearable." (Sarah 2019). The position expressed by Cardinal Sarah is unambiguous in its wording and indicates the main problem faced by the entire Latin civilisation today. The problem of the increasingly rapidly developing technology that supports the transhumanism ideology has to be widely considered, both by circles representing the paradigm of technoscience and by representatives of the humanities who have remained faithful to the fundamental principles on which the Latin civilization has developed so far. That is why extremely important seems the initiative of the *Scientia et Fides* editorial team which devoted

the entire issue 2/7, 2019 to this kind of reflection on transhumanism. Most of the texts present interpretations of transhumanism, seeing its roots in the historical philosophical concepts of the Frankfurt School. They present the concepts as a critique which relies on Adorno and Horkheimer's interpretation of the Enlightenment. They also collate them with the leading representatives of the contemporary transhumanism (Højme 2019) who are the founders of the World Transhumanist Association, currently known as Humanity+[3]. On the other hand, however, we can look at the problem of human improvement from the viewpoint of the Thomistic philosophy. Here comes the right perspective, considering the ideas of transhumanism from the viewpoint of man's nature, his limitations, but also his incredible ability to transcend limitations. One of the authors, Mariano Asla, states: "Aquinas' peculiar metaphysics, together with its anthropology in which the natural, the supernatural and the preternatural realms intertwine, can offer an interesting framework to assess the human enhancement project" (Asla 2019). However, a comprehensive glance at the problem of transhumanism is only possible if we can properly understand the main idea of transhumanism – mind uploading. This technological procedure is to be the culmination of efforts to construct the new man (Yampolskiy 2012). The figure of a transhuman being is to be a transition state between the contemporary mortal, imperfect man and the immortality offered to the human mind in an endless cyberspace structure. This concept has so far been considered only in terms of science fiction, but for the last few years the progress in the field of technology seems to be getting closer to it. And although the mere fact that it is not yet possible to make use of such technology, the path that is supposed to lead people to this possibility, in itself can effect very dangerous changes in society. We are already observing some symptoms of these changes today, and even though we do not always interpret them in the same way as transhumanists, we should be aware of their consequences.

[3] https://humanityplus.org [access 25.01.2020].

1. Artificial Intelligence

Artificial intelligence should be traced as a technology using the two pillars of transhumanist NBIC: Information Technology and Cognitive Science. Scientists representing the modern scientific paradigm first noticed a number of dangers associated with the very dynamic development of artificial intelligence technology. Max Tegmark[4] and his collaborators organized an important international Artificial Intelligence Safety Conference in Puerto Rico in 2015 to address this issue. The consequence of this activity was also the establishment of scientific research institutes, such as the Future of Life Institute[5], which not only organize annual conferences, but also conduct interdisciplinary research and identify threats resulting from the technological advancements. During the Asilomar Conference in 2017, a team of scientists identified precisely the risks associated with the uncontrolled development of AI technology and attempted to establish a code of ethical conduct to prevent its adverse effects. The document that was produced during the conference was called the Asilomar Declaration and is a set of 23 detailed rules. The document has so far been signed by 1583 scientists specialising in research on AI technologies and robotics and 3447 scientists representing other fields of knowledge[6]. It is extremely important that scientists working at universities all over the world and scientists employed in hi-tech corporations have noticed the problem. Indeed, it depends on them how such technologies will develop further and whether the uncontrolled development of certain AI algorithms will be managed in such a way that they serve the social benefit and do not further increase the area of dangerous and unfair applications. The general assumption of Asilomar AI principles points out that the Artificial Intelligence technologies are now widely used by all people in the world. However, to ensure its further harmonious development, it is necessary, i.a., to provide funding for the

[4] Max Tegmark – MIT, Professor of physics, author of *Our Mathematical Universe.*
[5] https://futureoflife.org/ [access 25.03.2020].
[6] Ibid.

beneficial use of AI in critical non-technical sciences such as economics, law, ethics and social sciences.

The authors of the declaration wonder what should be done to make AI systems do what humans want them to do and at the same time be safe and resistant to damage and external intrusion. In addition, the scientists wonder how to update the legal systems so that they are adapted to the implementation of AI systems and who should be given priority in cases of conflict: man or machine? Discussions on the declaration are currently taking place in the scientific community among representatives of different fields of knowledge (Garbowski 2017). It can, of course, only be regarded as a wish list as there is little practical way to enforce it. But that does not seem to me the major weakness of this document. The document creators seem to believe that they will be able to implement a utopian project, to derive the basic ethical principles from scratch and implement them using only logical principles in the advanced AI algorithms. They consider the issues of the mutual coexistence of man and AI without the subject actually. Man is treated by them, as well as by the transhumanists, as an unfinished, flawed and limited product of biological evolution. If they see any metaphysical aspects, it is only in the unexplained "gaps" in human knowledge that they believe will be filled with inevitable technical and scientific progression (Anderwald 2019).

The AI algorithms are already entering directly into the medical diagnostic processes. It is no longer man-doctor that is the leading component of the diagnostic process; the physician begins to play only the role of coordinator and possibly the last instance before making a decision in the process of applying medical technologies. An advertisement for the deep learning algorithm implemented by IBM as a commercial product called Watson may be symptomatic in this respect. As a system supporting the efforts of doctors, it is advertised with the slogan "I can read 5000 new medical studies a day and still see patients. What about You? (Topol 2019). So man has to acknowledge the superiority of the machine because it can analyse more data and make a diagnosis much faster. So it seems that the natural progression in the further development of technology will simply

be to connect the human doctor directly to the Watson system. But the machine will learn from man very quickly and take over their competences and the role of man will be gradually reduced. Is this the future of medicine we want? The problem of human replacement by a machine is important if we look at it through the prism of the planned use of mind uploading.

2. Mind uploading

Copying the human mind is a process that is not yet technically feasible. However, using the methodology of scientific reductionism, the proponents of transhumanistic ideology believe that if we already know how to imitate many human mental activities using computer technologies (Alfsvag 2015), then in the next few years we will develop technical possibilities to combine these methods and transfer them to a copy of the human brain created in digital topological spaces. A representative of transhumanism, a precursor of the practical implementation of mind transfer Keith Wiley is already considering the practical problem of two copies of the mind coexisting simultaneously: "The biggest philosophical conclusion derives, via carefully examining the implications of patternism for various mind uploading scenarios, is that following a split of one mind into two – both are fairly considered continuations of the original. It does not have to be either-or. If you are copied into a robot, the biological you and the copy should both be considered valid continuations of you" (Wiley 2014). Such a position is not fully justified, even as part of discoveries of neurosciences. The recreation of mental states that arise in the space of mind, which are described by a non-linear dynamic theory, is not possible due to the chaotic nature of these processes. The states in the space of mind are described by non-linear attractor structures which are unique and characteristic only for strictly defined initial conditions prevailing in natural neural structures (Osiński 2018). As a result of exact copying, we get not a copy of the human mind, but a neurodynamic structure that we cannot say much about today. Transhumanists do not seem to notice this problem and conduct increasingly advanced research using the opportunities offered by modern science.

Perhaps, paradoxically, it is the language of mathematics that, in practice, will help us stop the destructive ideas of transhumanists. Technoscience is sometimes referred to as an application of mathematical expressions that describe the material world. By using the language of mathematics, humanity has made most of its discoveries and inventions, and it is also the main tool of technological progress. We often forget that it also has its limitations, as does the natural language we use every day. One of these limitations is the ability to predict states in non-linear dynamic systems. This is where the determinism of linear mathematical models ends, neural systems require a form dramatically different from the applied models described in the language of mathematics (Schuster 2005). Their behaviour cannot be calculated, even on a small time scale. This is exactly the situation with predicting and at the same time copying and transferring the mental states that arise in the space of the human mind (Osiński 2018). The argument arising from the properties of non-linear dynamic systems seems stronger than Penrose–Lucas argument used so far, which uses Gödel's theorem on the incompleteness of formal systems to show that the human mind cannot be explained in purely mechanistic terms (Bringsjord 2000). Gödel's theorem does not set out the criterion of truth, but only the criterion of non-contradiction. In turn, the language of mathematics describing states of mind is unambiguous in determining the truthfulness of solutions. We do not know and are unable to determine how the states of mind will change e.g. in artificial, virtual digital spaces. So the "construct" that will appear in supercomputer structures, when technologically the mind uploading becomes possible, will certainly not be a copy of the human mind. Regrettably, we do not know what or who it will be. I also do not think that this problem is a sufficient obstacle to scheduling such experiments.

We can also state that another unresolved problem is the relationship of the human body to the human mind (Clark 2016). The subjective world of sensations and the objective world of neurodynamic processes have so far not been linked by a coherent scientific theory. The basic question to be asked is therefore: should we look for such a link at all? Should we not treat man as a whole where mental and material processes combine to form an

inseparable system of homeostasis, individual and unique. The scientific method of reductionism has already proved more than once unreliable, especially with regard to non-linear dynamic systems (Osiński 2019). Preferably, science should try to discover and describe those phenomena that describe a person as a whole, rather than treating a man as a set of separate elements. The transhumanistic vision of mind transfer completely ignores this issue.

Transhumanists consider the problem of mind transfer only in material terms, treating the mind only as a product of neural activity and therefore completely ignore the concept of the human soul. And yet, if we look at this notion in the simplest and most comprehensible way possible, even for atheists determined entirely by the paradigm of technoscience, they will have to give some logical answer. The concept of a dialogical soul can be identified in a "technological" way with a kind of dynamic connection between the personality of man and God. It is not, of course, a simple communication channel, an ability or a tool, but it certainly has to be reflected in the states of mind of the human being. „The biblical concept of soul shows us that there is no existence of a soul without a body. Therefore, any aspect of humanity cannot be underestimated and forgotten in scientific work. The soul is associated with the body, and not only with the abstract, immortal part of man existing autonomously in the space of humanity" (Szetela 2017).

From a technical point of view, for practical implementation of mind transfer, research is conducted in two main directions. First, they need to gather as much information as possible about the structure, biological development and functioning of the human brain. These data will be used to build a digital "neuronal matrix" on which a copy of the mind will be saved. To this end, various technologies are used to collect accurate information about the work of the human brain to create appropriate simulations based on them. The second direction, we can call it biological, involves the use of biotechnology methods to perform experiments on live human neurons. Research in this area is to allow accurate mapping of biological structures in the digital "neural matrix". To achieve proper accuracy, each of these routes uses nanotechnology methods. So here we have all four NBIC pillars

of transhumanist. In the following sections, the specific activities in these scientific areas will be very briefly summarized.

3. Information Technology

Numerical simulations of the structure of the human brain require powerful computing power. Classic supercomputers are not able to meet very high demands on computing power. According to Ray Kurzweil (Kurzweil 2006), simulating the human brain at the level of a single neuron requires zettaFLOPS[7], while the best supercomputer currently has petaFLOPS, a million times less. But today the situation has changed radically, because we already have a practical possibility of quantum calculations, which completely change the calculation paradigm (Bishwas 2020). In the field of Information Technology, the majority of the important discoveries take place in closed laboratories of multinational corporations, where it is not customary to publish the results of current research due to the current business model. In today's technology market, profit is the most important action driver; research results are usually made available only after the launch of a new technological product and anyway, most new technological information is kept secret. An excellent example of such a behaviour was the information announced by Google on 23 October 2019 that it developed a prototype of a quantum computer which it named Sycamore[8]. So it seems that Google has managed to build a quantum computer capable of calculations that are basically unattainable even for the largest modern supercomputers. They managed to overcome the problems related to the long-term maintenance of coherent quantum states for a longer period of time, allowing to perform practical calculations. Google representatives believe that this is a technological leap forward that will completely transform our civilization. Sycamore is equipped with a processor that uses the superconductivity phenomenon to perform calculations utilizing 53 qubits (Martins 2019). It practically made

[7] FLOPS (Floating operation per second).

[8] https://ai.googleblog.com/2019/10/quantum-supremacy-using-programmable.html [access 23.10.2019].

calculations that lasted about 200 seconds and if the same calculations were to be made by Summit, the most powerful supercomputer in the world today, built by IBM, it would take more than 10 thousand years. Although the results of research on the quantum computer have been published in a prestigious scientific journal, the scale of the undertaking is evidenced by the number of authors of the paper, namely as many as ninety-six. The authors represent mostly commercial institutions, technology companies, although they also work concurrently at universities. Such a large research team is certainly not a good place to discuss ethical and moral aspects or the far-reaching consequences of the technology being developed. Any studies conducted only at state universities have a more open structure. Researchers share their results, although more and more often the latest technologies are not published in specialist journals but in conference materials which are the products of meetings of very hermetic groups of specialists. Researchers use a specialist language that is full of advanced terminology of mathematics. Therefore, when discussing the latest, publicly available research results, we must be aware that they come from research projects that are usually already completed, and even newer solutions are still hidden in specialist laboratories.

Therefore, performing accurate simulations of the human brain with the use of a quantum computer may turn out to be much simpler than the simulation projects conducted so far. Using the classical, reductionist paradigm, transhumanists believe that in order to make a copy of the human brain, it is necessary to understand its structure to the level of synaptic connections of individual neurons. The results of neuroscience research clearly indicate that the mental phenomena in the human brain are created on the basis of synergy with the use of non-linear dynamic processes, while the structure of neuronal connections changes according to numerous neurodynamics couplings (Duch 1997). Therefore, a thorough knowledge of the very structure of neural connections is unlikely to allow the reconstruction of the exact mental states described by the neurodynamics (Osiński 2018). This is still an unexplored area of scientific investigation. However, the studies on

accurate mapping of the human brain have been going on for a dozen or so years and have now gained considerable momentum.

One of the oldest scientific projects, carried out since 2010, which is related to the human brain structures, is the project is carried out by a consortium of American universities called Human Connectome Project (HCP)[9]. The studies by scientists are focused on recreating the simulations of the cerebral cortex for 15–33 billion neurons, each of which can have up to 10 thousand synaptic connections. The project has been repeatedly expanded, as better and better technological solutions have emerged to analyse larger and larger data sets using BigData algorithms (Osiński 2015). The final result of the research is to specify the structure of the "neural matrix" of the human brain in order to find effective drugs for neurodegenerative diseases. The project is scheduled to be completed in 2022. The European equivalent of the HCP is the Human Brain Project, launched in 2013 which, however, no longer has utilitarian medical applicability goals, but is clearly intended to focus on building an "artificial brain"[10]. To this end the scientists perform a large number of brain neuroimaging studies using fMRI technology; they also work on biological materials and analyse the collected data using AI algorithms. The first stage of creating the "neural matrix", which will be a true copy of the neural structure of the human brain, is to create an appropriate visualization. It is supposed to represent all possible neural connections by assigning them appropriate parametric weights responsible for the way neural networks are activated. Such a graphical network is called a connectogram and was proposed by scientists from the Laboratory of Neuro Imaging in Los Angeles, California in 2012 (Irimia 2012). The method of human connectome examination is also used in the studies of human fetuses; scientists from the Dutch University of Utrecht examined 105 pregnant women using the fMRI method and reconstructed the fetus brain connectome at different fetal ages. The results of the research indicate that the most important functional features of the connectome are formed in the second and third trimester of pregnancy. According to

[9] http://www.humanconnectomeproject.org/ [access 01.12.2020].
[10] https://www.humanbrainproject.eu [access 05.11.2019].

the paper authors: "Understanding the organizational principles of fetal connectome organization may bring opportunities to develop markers for early detection of alterations of brain function." (Turk 2019). Thus, we see that the use of the latest diagnostic and analytical technologies allows us to examine even the functioning of the human brain in the fetal period.

In order to implement practical devices connecting the human brain with AI systems, it is necessary to thoroughly examine the structures of the human brain and it must done during its natural activity. Invasive research on the human brain is prohibited by law in most countries, which is why scientists from the Technical University of Lausanne initiated a project to study the brain of other mammals, starting their research with a thorough examination of the mouse brain. The project is called Blue Brain Project and is designed to create a virtual brain simulation using reverse engineering technology, a method already successfully used in AI algorithms (Vinny 2019). In 2019, Idan Segev, one of the computational neuroscientists working on the Blue Brain Project, gave a talk titled: "Brain in the computer: what did I learn from simulating the brain." In his talk, he mentioned that the whole cortex for the mouse brain was complete and virtual EEG experiments would begin soon. He also mentioned that the model had become too heavy on the supercomputers they were using at the time, and that they were consequently exploring methods in which every neuron could be represented as a neural network[11]. Unfortunately, the scientist working on this project is not considering the ethical problem of constructing a working simulation of a mouse brain. He is only interested in the usable aspect and the problem of the possibility of extending the same methods to the brains of larger mammals.

The scientists working at the *Korea Advanced Institute of Science and Technology* have developed a prototype implant, implanted directly into the brain, emulating various functions with direct control via smartphone (Qazi 2019). This implant is designed to administer drugs and measure the neuronal activity of the cerebral cortex under the influence of their use.

[11] https://www.youtube.com/watch?v=sEiDxti0opE [access 25.01.2019].

The assumption is that this is to be a smartphone-controlled implant that allows the measurement of neural activity with the possibility of direct biochemical activation from outside. The experiment with the prototype was carried out on mice and ended up achieving all initial assumptions. Therefore, the way to implant the technologies used in cellular phones directly into the human brain only depends on obtaining permission for such experiments. The new BCI[12] technology thus gains another important technological opportunity.

However, in order to gain direct access to neural structures in the human brain it is not necessary to use invasive methods. There exist technologies to examine the activity of neuronal structures in the human brain using fMRI (Functional Magnetic Resonance Imaging). This method is now widely used in medical diagnostics, but scientists from Professor Jacek Gallant's group from the Vision Lab (Huth 2016) at the University of California decided to use this technology to construct the Mind's Eye device. It is able to see, in a literal way, the images that are created in the space of the human mind. First, the scientists wanted to distinguish between images that were created during normal viewing of the outside world and visualizations that we created ourselves e.g. during the process of thinking and sleep dreaming. In order to reconstruct the image on the basis of the activity of neural correlates, specialized AI algorithms were used, which learned to reproduce the states of human mind on the basis of repeated experiments involving the presentation of various images. Based on the collected data a visual database of mental images was created. Then the subjects were ordered to close their eyes and imagine any images; the system was able to recognize them with an amazing efficiency of up to 90 percent. This method can of course be used e.g. during interrogation of terrorists; they will not be able to hide their real thoughts or images, the system will recognize images created in their minds with great accuracy. However, from the viewpoint of transhumanism, this research is more serious, it allows us to read accurately not only the neuronal structures of the human brain, but also to determine

[12] BCI - Brain-Computer Interface - is a technological direct communication between human brain and external computer system.

the visual states, i.e. images that appear in our mind. After all, such structures can be saved and transferred to the external virtual spaces, and there they can be freely manipulated.

Using similar algorithms with the application of the Deep Learning method, Japanese scientists from the Kamitami laboratory in Kyoto constructed a device for spying human dreams (Horikawa 2013). Using the fMRI image analysis during falling asleep or REM sleep phase, they can reconstruct images that appear in the human mind space during sleep. In this way, we can already look at people's dreams today and even influence their content using appropriate biochemical aid. As already mentioned, experiments involving direct interference with human brain tissue are legally prohibited in many countries. However, implants already implanted in the subjects in connection with other diseases (Parkinson's disease, tenth cranial nerve stimulation implants) can be used. Such research has yielded astonishing results that even identify the faces of people who appear during stimulated imagery of different scenes and during the night dreams (Chang 2017). According to the latest reports, about 200 properly arranged electrodes in the brain are enough to accurately read all visual objects from the entire space of the human mind (Rossion 2017).

4. Cognitive Science

If we consider the practical operation of mind uploading, we wonder why people should agree to give up their lives in the real world and transfer their entire existence into an uncertain virtual world environment. It seems to be a completely fantastical concept and rather few people will be willing to get rid of their bodies and replace them with digital simulations. However, let us try to take a look at the contemporary condition of the society, which has been using the latest information technologies for many years and unfortunately usually does so uncritically. It is also very important for the transhumanists to prepare the society for uncritical acceptance of the idea of total progress in the widespread use of information technologies. Progress as understood in this way is best reflected in Steven Pinker's phrase, in which

he refers to twenty book entries, in which only optimistic references to the process are presented (Pinker 2018). And here we must state that the most important point of reference is the anthropological context, because the contemporary social system of developed countries of the world is liberal capitalism which no longer needs people, but only consumers. John Paul II warned against such a danger in his encyclical Centesimus Anus : "In the sphere of economics, in which scientific discoveries and their practical application come together, new structures for the production of consumer goods had progressively taken shape. A new form of *property* had appeared — capital; and a *new form of labour* — labour for wages, characterized by high rates of production which lacked due regard for sex, age or family situation, and were determined solely by efficiency, with a view to increasing profits."(John Paul II, 1991).

So instead of Christian anthropology we are dealing with consumer anthropology (Tadajewski 2006, 8–25). That is why the constant increase in production, sustained economic growth and, consequently, increased consumption possibilities are such important determinants of social development today. Therefore, profit becomes the most important virtue as an end in itself the. Modern man is unable to cope with ever higher standards of performance, availability and control. Therefore, the ideas should be promoted that it is necessary to improve the human being, to increase human abilities so that men can consume more and make more and more profit. In this way, man ceases to be a subject and becomes an object which is influenced by the contemporary forces of technology, science and the utopian ideologies that follow them.

The worship of continuous progress translates into the need for continuous "human development", but not in terms of values, but only of efficiency and effectiveness of actions. This process takes place on many parallel planes, the most visibly in the changes of the modern pharmaceutical industry. The man's improvement starts right here. Newer, better and cheaper chemicals appear on the market to improve us, to allow us to overcome our limitations and achieve a state of "joyfulness" with the least effort, whatever that means. Every day, beautiful and joyful users of various advertised substances smile

at us from smartphone screens, TV sets and newspapers (Aksu, 2020). The borderline between a medicine and a supplement or chemical enhancer is becoming less and less visible. A sick person who seeks help is turned into a customer-consumer who can be "improved" and cured alike. If, therefore, we improve the human body without any reflection, treating this process as a normal commercial transaction, then nothing stands in the way of improving the human mind as well. The examine, describe and want to change the human mind, because the one we have received as a gift from God is outdated, his memory is defective, it cannot read thousands of pages of texts a day, let alone writing scientific papers in bulk. A new, better, more efficient one should therefore be created. Technologies are already emerging to define moral and ethical concepts using machine learning and AI algorithms (Bostrom, 2011). Cardinal Sarah warns against such conduct in the following words: "A man wants to get rid of his body of blood and bones to wear silicon and steel. Cells age, bodies wear out, while metal can be replaced. This is why the transhumanists explore ways to recharge data in the brain and transplant personality to another body!" (Sarah 2019).

The Internet is considered to be the avant-garde of fundamental changes that are ultimately to lead to a transhumanist revolution. Its role in the transhumanistic narrative is not limited to the tool of communication and popularization of transhumanistic ideals. This process is much deeper and has been going on for a long time. These digitalization processes, especially in relation to the communication systems, are already wreaking havoc especially on the youngest generation. Many teenagers can no longer live without access to the Internet, still staring at the "black mirror" of their smartphone, can no longer even move smoothly and safely in the real world. For these young people, who already live to a large extent in the digital world, the very concept of "permanent transition" to the virtual spaces will only be a formality (Wartella 2016). Young people today more and more often use applications simulating a personal assistant, a digital spiritual guide or a virtual coach (Carr 2010). These applications are increasingly used to interact with the AI algorithms imitating human voice and behaviour. At the same time, they cause a loss of communication and interaction skills

in the real world. The transhumanists perceive these processes as preparing to make digital copies of every man (Sparrow 2019). This is the most difficult procedure, from the viewpoint of transhumanism ideologists, as it requires a change of habits in people who are supposed to feel better in the world of their digital copies than in the real world. Already today, many researchers point out that owners of social networking sites know much more about young people than their natural parents do. If this process can be improved and accelerated, then the application of technological changes and leaving a copy of the human mind locked in the cyberspace will only be only a "technical formality".

5. Nanotechnology

Nanotechnology is used in a wide range of solutions concerning direct influence on human brain functions. However, one of these solutions is particularly relevant to the concept of mind transfer. Researchers from Stanford University, working on a project for the US military agency DARPA[13], developed special nanofibres with an extremely small diameter that host in a 1 millimetre diameter microduct over 50 nanofibres, each of which can be an independent electrode. With the aid of such electrodes, hundreds of thousands of electrodes can be placed in the brain tissue with one puncture in the human skull. It is a technology that enables reading of images and sounds from inside the human brain of unprecedented quality. Such electrodes are already being produced in the US company Paradromic[14] and the first reports from the Stanford University information center, dated November 2018, mention positive results of human testing[15].

Nanotechnology also allows for direct intervention in the structure of the human brain in a little invasive or even non-invasive way. Nano-implants have already been built and tested on humans to support the operation of

[13] Defense Advanced Research Projects Agency (DARPA).

[14] https://paradromics.com/ [access 15.04.2019].

[15] https://neuroscience.stanford.edu/news/brain-implant-lets-people-limb-paralysis-compose-and-send-emails-select-videos-and-even-play [access 15.04.2019].

human memory. They are used to treat people with brain damage, whether it is due to injury or illness. Such nanomodules – Restoring Active Memory – allow to restore some memory functions especially in people with damaged hippocampal structures (Osiński 2018). Results of clinical trials show that the use of such implants improves memory by over 30% (Hampson 2013). So we already have a practical technology that will allow us to expand the human memory capabilities. Another idea for direct intervention in human brain structures was presented in September 2018 by scientists from Brown University[16], who used specially programmed nanoparticles for this purpose. They are syringed into the blood by classical injection and settled in the blood vessels of the brain, controlled by an external electric field. Such nanoparticles, called neurograins, can be used to collect data from even the deepest human brain structures. Therefore, the technological possibilities of modern science are already enormous; they are usually created with good intentions to help sick people in their suffering and to support the processes of rehabilitation. However, proponents of the ideology of transhumanism will certainly try to use it as a tool to facilitate the creation of a practical mind uploading system (Pasley 2012).

6. Biotechnology

This subjective approach to the human beings combined with the uncritical use of biotechnology already now leads to serious practical problems. In the laboratories of the University of Kyoto, Professor Hidey Sakaguchi's team conducts experiments on culturing human neurons. The results of his recent research have shown the functional activity of such laboratory constructions, similar to that observed in premature infants (Sakaguchi 2019). Those experiments have been widely echoed by the scientific community, but most of the comments did not cover ethical aspects but focused on indicating that the next technological threshold was exceeded[17]. In their publication,

[16] https://www.brown.edu/carney/research-project/neurograins [access 20.01.2020].

[17] Cell Press, Researchers grow active mini-brain-networks, https://www.eurekalert.org [access 02.03.2020].

a team of scientists from the Japanese university described the results of research that were obtained during the culturing human neurons using stem cells. Such cells are obtained from the human body and are characterized by the potential for a very large number of divisions and differentiation into all cell types present in the human body. Scientists have been using this type of cells for a long time, searching, often effectively, for methods to replace diseased body tissues with new, healthy ones which take the place of the damaged ones. Stem cell therapies are already used in diseases of the immune system, skin grafts or to treat eye corneal damages (Birbrain 2019). However, Sakaguchi's team decided to culture human neurons and track their development during the formation of the cerebral cortex. Scientists have defined the purpose of the experiment as the creation of a "brain substitute" to study the initial stages of the creation of neural structures in the human brain. They have also succeeded in developing a way to study such structures using monitoring of ionic currents generated in neuronal correlates. The cultured tissues of the human brain contained thousands of neurons which scientists could not only look at visually, but above all monitor their work in a way similar to the classical EEG examination. Theoretically, such research was supposed to help to better understand the processes of information processing by neurons in the brain and to identify possibilities of accelerating their work. Such a goal can be very useful in many neurological diseases. However, during the experiments, the team of scientists noticed a very serious problem. It has been noted that there are no technical limits to the number of neuronal structures cultured, so cultured brains can grow more and more, and there is even the possibility that at some point they will start to show conscious behaviour. In their paper, scientists admittedly state that "awareness requires subjective experience and cultured neuronal correlates are deprived of it because they do not receive any information from outside" (Sakaguchi 2019). Here, however, a practical question arises: what prevents a camera, microphone or other sensors from being connected to such tissues in the laboratory? Treating the phenomenon of consciousness as just a simple consequence of neural activity must raise very serious objections. But what should scientists do if

the neurons cultured in this way start to show more complicated activity? Mini human brains were cultured in the Kyoto University laboratory for several months, producing increasingly complex bioelectrical activity. In their paper, the Japanese researchers summarize their results with the following statement: "our method provides the ability to examine and tamper with neuronal activity in the developing human being" (Sakaguchi 2019).

Unfortunately, such experiments may also indicate a potential desire to interfere in the natural brain development processes of the human fetus. And this is already a specific transhumanistic technology, not only enabling direct influence on conscious processes in the human brain, but also designing and interfering in the natural development of humans. It would seem that even very lofty and noble goals should not justify this type of research. After all, there is still the question of the "laboratory material" which is the cultured collections of human neurons. After all, the question should be asked when these tissues can begin to manifest conscious behaviour? Then, can these constructs also be treated as biological material, or should we look at them from the viewpoint of the nucleus of human consciousness, comparable to that which can be observed in sick people or those mutilated in accidents?

Such ethical questions, touching on the very core of the concept of man and the sanctity of human life in the basic interpretation of Christian anthropology usually remain unanswered. Legal prohibitions, recourse to conscience and higher ethical values are becoming less and less effective. The scientific communities, grouped in large international teams, do not seem to care about them. We are also observing activities which aim at changing the law or looking for peculiar precedents in order to carry out further research and cross further borders. This path was chosen by a team of scientists from the University of California headed by Professor Cleber Trujillo, who published research results on the design of human neural networks (Trujillo 2019). Using a method similar to the Japanese one, California scientists are already testing a method of programmable culturing human neurons in order to obtain assumed models of their dynamics. So this is research to design the perfect human brain as early as in the fetal period. So culturing the human brain in a laboratory starts to enter the practical

phase. At the University of Tokyo, on the other hand, research is planned, which until a few years ago seemed impossible in the laboratories of the civilised world. A team of scientists led by Professor Hiromitsu Nakauchi received permission from the Japanese government to conduct an experiment to culture a human-animal hybrid. In many countries, i.a., in all countries of the European Union, scientific research that is ethically questionable is restricted or explicitly prohibited. But the Japanese government has recognized as legal the experimenting on human embryos. Nakauchi's idea is to be a way to solve the problems of transplantology (Yamaguchi 2017), it is to meet clearly utilitarian goals, and for this reason, basic ethical principles are abandoned. Statistics show that in the United States alone there are more than 100,000 people on transplant waiting lists, so the laudable end is to justify the means. The scheduled experiment is to implant human stem cells into embryos of genetically designed rats. The rodents have been genetically modified so that they have all organs except the pancreas. In the rat genome, the genes responsible for pancreatic growth were identified and removed by genetic engineering. Hence, human stem cells will be inserted into the rat's body, and they should be divided there to form a rodent human pancreas in the body[18]. The cultured rat-human pancreas can be used for human transplantation and produce natural human insulin also for therapy. It is not difficult to imagine that human stem cells implemented into animal organisms can turn into any kind of cell, not only a pancreatic cell but also a human neuron. Then the rat's body will start to grow human neural structures in addition to the human pancreas. Human neurons in a rat's brain. This is how the real effect of the experiment may look in the near future. What will these hybrids be? Professor Nakauchi's team will soon have to answer this question.

The experiments described above carried out in laboratories shall be included in the transhumanistic declaration. It should be recalled that the basic provision of the official declaration is: "Humanity stands to be profoundly affected by science and technology in the future. We envision the

[18] Japan approves first human-animal embryo experiments, Nature News, 26.07.2019. https://www.nature.com/articles/d41586-019-02275-3 [access 20.01.2020].

possibility of broadening human potential by overcoming ageing, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth."[19] It is clear from this that the goal that the creators of the "post-human" set for themselves can be achieved in any way, without the analysis of potential victims, suffering that it can cause during the implementation and with the violation of all possible laws of the civilized world. A human being who uses human mental abilities becomes only a tool to enable full control over the world of matter. Such actions are to free humanity from worries, limitations, suffering or even discomfort. Full subordination to scientific methodology is to grant scientific cognition the status of the only method of acquiring knowledge. While knowledge is to be a reservoir of the most effective and pragmatic ways of solving all problems. Including moral and ethical ones.

The transhumanist declaration is manifested in the practical efforts to establish legal standards allowing full morphological freedom (Sandberg 2013), including the full right of everyone to modify their body. The only limitations are to be the technology and financial possibilities available to a particular person. The consequence of such an attitude are further demands for legal changes described as reproductive freedom, i.e. the right of parents to choose any reproductive technology. Such actions are to allow to achieve a peculiar kind of immortality which means a constant extension of life, treatments stopping the ageing processes and finally an ultimate transfer of consciousness to virtual spaces of digital machines.

Conclusions

A very brief outline of some of the latest experiments that are carried out in research laboratories shows that we are already very close to achieving the technical feasibility of mind transfer. The new quantum computers already allow for digital simulations of the whole human brain. A huge amount of data on the structure, work and functioning of the human brain at the level of individual neurons has already been collected. It is already

[19] Transhumanist declaration, https://humanityplus.org/philosophy/transhumanist-declaration/ [access 20.01.2020].

technically possible to connect the human brain to a computer via BCI using nanotechnology. At every stage of experimental work in university laboratories we can observe many ethical problems, but they do not prevent us from continuing, expanding and planning further and more advanced experiments. We can no longer expect scientists to refrain themselves from morally questionable day-to-day experiments. Similarly, we can no longer live with the hope that these experiments will fail. Perhaps we have already gone too far and in our laboratories there will be constructs that we could not have imagined before.

In such a very cursory overview, it seems that the technological problems necessary for mind transfer have largely been solved. The problem is a certain lack of wise thinking about the product of such transfer. There is also a certain danger of a non-reflective approach to the use of AI technologies in particular in everyday life. Many people, especially young people, get used to constant activity in computer networks, where they more often interact with AI algorithms than with a living person. So it is difficult to say today which problems are more important: those requiring improvement of technology or those concerning the condition of contemporary man. The ethical condition of modern man must certainly be improved, but not only by means of technology.

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