

The Biotechnological Revolution and Its Impact on Mankind.

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Abstract:

In this article, we show the impact of the biological and technological revolutions on modern man. In the beginning, we point at the first steps undertaken by these two sciences towards solving some of Humanity's unbearable health problems. Scientists devoted themselves to the research in order to invent different parts for the human body, which resulted in the production of a human-machine (robot). The difficulty in distinguishing a robot from a human being is a decisive turning point in human history, especially when it comes to feelings and emotions. Things did not stop here, as the development of information sciences, cognitive sciences and nanotechnology has made scientists think about how to enhance the human body with many technological appendages to adapt to a world overwhelmed with technology. This principle is opposite to the nature of man, who constantly strives to change his situation, which makes us wonder: What is the image of the new human being established by biotechnology? Will our self-understanding of man as an animal species with its own characteristics change? What is the fate of the human being in which all these artificial devices.

Keywords: Biotechnological revolution. Cyborg. Future of mankind. Human body spare parts. Man-machine, post-human.

1. Introduction

The biological revolution is moving towards understanding and controlling human life, especially with the discovery of DNA in 1953 by James Watson and Francis Crick. This discovery was followed by extensive research in the field of genome and the modification and alteration of the human genetic map. Since then, man has been living on the verge of a new era.

An era that witnesses a radical change in values due to breaking old established limits in all fields. Man began to take rugged paths like decoding the genetic code, cloning technology, and merging the cells of different animals to obtain new hybrid animals. In neurology, research has focused on trying to understand the structure of the human brain. Research is still working on scanning the human brain on the computer. In the field of artificial intelligence, research has resulted in the creation of robots from pure plastic. It is difficult to distinguish them from human beings, and it has the ability to show emotions such as fear, shyness, and other different feelings.

Science did not stop there, biology - technology today is fighting a new battle and heralds the entry of humanity into a new era. The Post-human era or the human- machine era or what is known as cyborg (CYBORGS). Science is trying hard to rebuild man by combining his natural systems with artificial electronic devices.

If this attempt is established on the ground, the era will witness a profound transformation in the foundations of human societies. Therefore, we ask: What is the image of the new human being established by biotechnology? Will our self- understanding of man as an animal species with its own characteristics change? What is the fate of the human being in which all these artificial devices are integrated? And what are the implications of the technological and biological revolutions? The importance of this topic lies in the fact that it addresses issues that have a direct relationship with the human being who has suffered from a moral shock. Science has transformed from a tool for achieving the worldly essence into a tool that controls it. In this research, we have adopted the critical analytical approach that is appropriate to the nature of this research. As we pointed out at the beginning, some of the obstacles facing genetic engineering, especially in the field of organ transplantation obtained from either the dead or donors often causes complications for those to whom it is transferred to due to the resistance shown by the recipient body. The scarcity of donors has forced scientists to resort to creating artificial organs as replacement parts to help patients. However, with the development of science, man began to engage in a new battle, embodied in the historical shift from knowing how to build man to making him or building a robot that is half human and half machine. This topic is worthy of research and investigation, because science no longer knows the limits at which it should stop.

Certainly, this matter has serious repercussions not only on humans, but also threatens life as a whole. When scientists set out to violate nature by creating beings that are completely free from the inevitability of birth, this indicates the loss of the moral foundation and the deviation of the Enlightenment project from its original goal, which was formulated in the eighteenth century and which emphasizes the service of science to humanity. Our century is witnessing an unprecedented boom in the field of modifying all life (plants, animals, humans). Moreover, when the modification includes humans themselves, it may lead to the end of human race, as we now know them, and the creation of a new human species.

2. Part one: Achievements of the Biotechnological Revolution:

1. External Artificial Organs:

1.1.The Artificial Kidney:

The cooperation between the biological revolution and the technological revolution has opened new horizons for modern man. Man has moved from the stage of transferring human organs and implanting them in the patient's body, to the manufacture and innovation of artificial replacement organs. This technology spread in many areas including external replacement organs, such as the kidney, hand, leg, teeth, knee... and internal replacement organs such as the heart, brain, and others... In this section, we will try to explain the first steps that science has taken towards integrating the human body with artificial organs in order to help it replace lost or damaged organs that are no longer able to perform their functions. Human organs transfer often results in complications due to the recipient body's resistance to the transplanted organ, which is considered a foreign body, or as a result of disease. There has been an attempt to replace human organ transplantation with artificial organs. The first operation embodied in this context was the operation to implant an artificial kidney outside the body at the Cleveland Clinic. Dr. GOLF, head of the artificial organs department, is considered the first to manufacture an artificial kidney in the Netherlands during the Nazi occupation. Cellophane, window curtains, and a water container were used to make the first kidney through which blood

passes to be filtered and then returned to the patient. Thanks to this technique, medicine was able to save many patients suffering from severe kidney failure (Al Haffar, 1984, p153)

1.2. Artificial Blood:

The first artificial blood transfusion was made at Fukushima Hospital in Japan, for a patient with O- negative blood type, which is a rare type. The doctor supervising his treatment had two options: either save the patient by all available means, or let him die due to the lack of donors. The doctor decided to inject his patient with a liter of fluorocarbon into his arteries. The patient remained steadfast with this solution for a full week, after which the patient's body was able to produce normal blood and there was no longer any danger on his life.

1.3. Artificial (Prosthetic) Hand and Leg:

These artificial organs need the human body's energy to move i.e. it results from muscle movement, and the patient must do strenuous exercises to accustom the body to using them. This artificial hand or leg remains unable to transmit sensations such as cold, heat, hardness and softness (p.155). As for implementing the orders issued by the brain, Dr. Rabichon has placed in this hand a microcomputer in which the brain's orders are concentrated and which is responsible for redistributing them. The Japanese have invented artificial hands that respond to the voice commands issued by their owner, such as ordering them to pick up something, fill it, or something else (p.155-156).

1.4. Artificial Knee:

There are some serious attempts to develop the artificial knee, in a way that makes it capable of performing the joint role of the real knee. There are also other attempts to make metal bones and silicone feet, covered with a layer of human skin in a shape that makes them resemble real feet (p.156).

1.5. Artificial Eye:

Within the framework of developing engineering and technology, there are serious attempts in developing vision. Eyes equipped with eyelashes have been created, in a way that completely resembles real eyes, with their natural colors and eyelashes. The latter remains only formal, waiting to be equipped with a very small camera connected to electrodes implanted in the brain so that it makes it perform the same function as the real eye (vision) (p.156).

1.6. Dental Implants:

The dental implant process is witnessing a continuous and noticeable technical development, and it is of two types: Upper and lower jaw implants. In the first, the technique depends on placing a metal holder made of titanium in the jaw cavity inside the gums, which is supported by the bone, where it can hold a few teeth. In the second (lower jaw), it depends on the technique of implanting small needles that carry a tooth or molar, in addition to the metal holder that carries one or more teeth. However, it may not be successful if the body rejects these materials and the organs implanted in it. The materials used to make traditional bridges that are placed in the mouth are also very expensive, as they are made of ceramic and platinum gold, so scientists have suggested another material, which is "glazed carbon." (p.156).

2. Internal Prosthetics:

Some Achievements of bio-technology engineering is the manufacture of artificial legs and hands, which pushed forward research in artificial replacement organs. The development witnessed by this scientific and technological field is the result of the urgent need to help the patient to overcome health ordeals. Replacement organs differ in the way they are integrated to the body, including those, which are connected to the body from the outside, and others that are implanted inside it. These artificial replacement organs are containing artificial veins and valves that ensure the arrival of biological fluids to the desired areas in the patient's body. It includes

artificial lung, artificial kidney and electrical stimulators for the heart, which activate the heart muscle tissue that has begun to weaken p.157).

2.1. Artificial Brain:

Creating a miniature electronic brain to replace the human brain has become a difficult task for scientists due to the complex structure of the brain, and the various and numerous functions it performs. However, there are some attempts made by Robert White. Although these laboratory experiments were conducted on animals (rats and monkeys), the aforementioned scientist was able to keep the brains of rats and monkeys alive after removing them from their heads. He also implanted another head into the body of a monkey that retained its original head, and he noticed that the removed head functioned normally. The process of replacing the monkey's head with another one was able to keep the animal alive for a week, with it performing several movements, including moving its eyelashes, lips, or ears, while its four limbs were paralyzed due to the inability to connect the spinal cord (p.158). The goal of these studies is to know the characteristics of the brain. The main result was that there is a difference between human brains. The electrical nerve currents that flow in the human brain are also different and numerous, and these currents are responsible for the intellectual activity of the brain. The first experiments in this field were conducted on bulls in the ring and on monkeys.

The scientists who specialize in this field implanted electrodes - a process that causes no pain or discomfort to the animal - connected the electrodes to wires through which electric currents flowed. The scientists conducting the experiment were able to stop the hungry monkey from eating after it had started, or making a full monkey eat again, or making it sad, happy, cheerful, angry... and other mental and psychological reactions (Al Karmi, 1978, p231). After that, many experiments were conducted on animals in order to control their behavior. This experience was transferred to humans, as scientists insisted on studying the currents of the brain in its intellectual and psychological states. Scientists counted all these currents and classified them. They have come to know the reasons that generate it, and research in this field continues despite the concerns that the latter raises (p.232) Research in this field seeks to create robots and link their activity to electronic computing minds. So that this robot can perform planned actions that have an impact on human society. So what is a human-machine? What are its characteristics?

3. Part two: The Technological Development and the Fate of Man:

3.1. Man-Machine (the arrival of a new intelligence):

Some experiments conducted by scientists such as: (Ross), (Bolok) and (Frank) show that robots have the ability to think. Creativity is no longer limited to humans alone. These machines can learn and improve their performance, and some types do better human learners (Al Haffar, 1984, p.171). These robots are purely made from plastic. In way, they are very similar to humans as they have the ability to move their arms and legs. They can also get emotional, smile, pretend to be shy, scared, cheerful...etc. Someone that saw them described them as "being able to do everything, except bleeding" (171-172).

These humanoid robots resemble to humans in such a way that it is difficult for us to distinguish between the two. Humanity is going to reach a turning point because of the human-machine that has the ability to react, and its behavior is no different from the behavior of a human being. This raises the problem of emotional and moral values in relationships. Is it possible that there will be emotional or sexual relationships between humans and machines? Some scientists believe that there is a great possibility such relationships between humans and machines could become real. If this happens, it would not express an amazing progress but a dangerous decline in values of our civilization (Koenig,2020, p62). The struggle is not against robots, but it is related to resisting the robot embedded in the human being itself (Ibid, p71) i.e. the goals of science must be reconsidered.

3.2 Cyborg (Towards a new image of mankind):

The biotechnological revolution seeks to combine man and machine, which is called cyborgs, “humans with human and semi- mechanical specifications.” (Al Hamdawi, 2014, p13). The first steps toward the establishment of a heterogeneous human- machine construct have already been taken, not by a single insane scientist, but by thousands of the most skilled engineers, mathematicians, biologists, surgeons, chemists, neurologists, and communications experts (Al Haffar, 1984, p.170). This means that the “fall and collapse of the natural boundaries that we used to be accustomed to i.e. humans will be afflicted at the morally and ethically, due to a profound transformation in the foundations of human societies.” (Al Hamdawi, 2014, p.244). The twenty-first century is witnessing an elevation in the field of biotechnology due to the developments achieved by scientists in the field of manufacturing alternative body organs. Biotechnology has been able to rebuild a human being, or produce a new one with specifications we have never seen before i.e. cyborg. Why not, as long as all the tools are available to replace a parts of human beings “human beings which are half human, and half machine, metal and synthetic plastic devices.” (Abdul Hassan,1990, p.169).

Extensive research in the fields of biology and technology has enabled scientists to create many different spare parts for the human body. It includes various types of artificial skins, heart valves, artificial vessels that act as arteries and veins. It was the reason behind the creation the artificial arms, legs, feet, and spinal cord implants, in addition to all types of joints, jaws, knees, shoulders, forearm joints, wrists, and fingers...(kerzwell,2009,p.182). Biotechnology has successfully implanted a way to control the bladder. Some machines are manufactured from synthetic materials and others combine new materials with cultured cells that can replace organs such as the liver, pancreas, and others. For example, breast implants have been successful for a long time. (p.182). Some of the successfully invented artificial organs that were used in people who were disabled are a metal part replaced a part of the crushed skull, an electrode implanted in the brain, a cornea made of artificial plastics, an artificial eye, an artificial ear and an artificial chin made of silicone, a windpipe made of plastic and hearing aids for the deaf, and a larynx made of rubber (Abdul Hassan,1990, p.200).

When talking about the integration of artificial parts as human body parts, we can point to the experiment that was accomplished by some scientists from the Soviet Union and the United States of America. They implanted special sensors to pick up signals from the severed nerve endings. Then they doubled these signals and used them to move the prosthetic limb, which turns into a sensitive machine that responds to the human nervous system, which in this case does not need to use the idea, because of that, the artificial limb will receive commands directly from the nervous system. These prosthetic limbs respond automatically just as a human hand, leg or eye would. (Al Haffar, 1984, p.173). Based on this experience, the idea of rebuilding the human body with artificial materials is achievable on the ground, especially since “the era of neural implants continues... (Ray Kurzweil,2009,p.182).

The idea of a human being amplified by technology crystallized at NASA, where a group of researchers hypothesized a way to colonize and invade other planets (Jacob,2006,p.98) The proposal was to create a superhuman, a technologically enhanced human being who would be better able to cope with the conditions around him. The human mind in the industrial age was able to invent the first machine to process big data (the computer), which caused a cyber revolution. This later has turned the world into a vast field of information. It was natural for man to enter a new era, which is the era of extensive communications. Then the developments achieved by the biological sciences made man open up to an infinite set of possibilities that had long been confined to science fiction (p.98). The year 1998 AD is considered a decisive moment in the transition to post-humanity, when Kevin Warwick, a cybernetic scientist in England, conducted the first experiment in which he enhanced his body with a machine, and thus what

is known as: Cyborg - 1 - was born. Cyborg 1). He implanted an electronic chip in his arm, which provides information to the computer. Thanks to this chip, his informant can detect his presence, open doors for him, and turn on the lights without him moving (Jacob, 2006, p.361). In 2002, Kevin Warwick conducted a second experiment called Cyborg 2, where he implanted a second electronic chip in his peripheral nervous system and was able to remotely control a robotic arm (p.86). Since then, his team has come to believe in the possibility of merging humans and machines and creating a new species called the cyborg, or a human enhanced by technology. Kevin Warwick's team created a robot called Gordon whose brain was made up of electrical wires and neurons from mice, and it had the ability to learn from its mistakes. Ray Kurzweil predicts that the third version of the cyborg will be present in 2030 or 2040 AD, and this achievement will be a complete review of the human project (p.65).

The point of this is that transforming and changing the human body by enhancing it through various technologies has become a project run by scientists who saw that natural evolution is very slow. Today, man must adapt, adjust and integrate with various technologies, including: nanotechnology, as some scientists have seen, such as: Ray Kurzweil: Replacing the human diet with Nano robots would make humans stronger, more resilient and healthier, and traditional food would become just a simple sensory cultural experience. Nano robot technology can eliminate obesity and other diseases, because it will regulate blood circulation and hormonal secretion according to the body's demands (p.61). Before that, in 1996, the Australian artist (Sterlak) implanted a third ear in his arm, the purpose of which was not to pick up sounds. It is rather, the opposite is true: it emits sounds, and can speak to anyone who approaches it. It also enhances physical senses from a distance (p.142). There are many experiments of this type, and it is noticeable here that the person did not stop at replacing the lost or permanently disabled limb, as happened to the South African runner. Oscar Pictorius who lost his legs and replaced them with carbon legs. Thanks to them, he was able to defeat his competitors. Rather, the matter went beyond that, and scientists became the ones who plan projects to modify and enhance humans with technological parts. When scientists become the ones who control the fate of humans and life. This threatens the extinction of man as a human being with the arrival of a new human species enhanced by various technologies. This situation expresses a crisis of triple separation: reason, will and emotion in the twenty-first century human being.

The worship of technological progress that characterizes contemporary man has made him draw a new direction for humanity. Today, science is trying to redefine man in terms of description (the body) and in terms of the standards and goals that it seeks to achieve. In terms of the external description of man, technology has presented a new image of the human body by hybridizing and merging it with the machine. In terms of standards, technological progress has become able to provide a unified standard for humanity for the first time in history, as science has begun to determine what characteristics a thing must have in order to be human (Jacob, 2006, p.68). Today, man, in the name of progress, is turning the world into a healthy and poisonous place. He is polluting the air, water, soil, animals, and himself. (Fromm, 2006, p.123).

Conclusion:

After we have pointed out some of the achievements of the biotechnological revolution that moved from the stage of research into nature to know and understand its characteristics, to a new stage that we can call the stage of producing nature i.e. the production of new beings that have completely escaped the fate of natural birth. These beings came into the world through the union of many sciences, including: biology, technology, cognitive sciences, and information sciences...They are new creatures resulting from genetic hybridization or by combining natural and mechanical organs (Cyborg). Alternatively, they are objects made of a bundle of electrical wires, pure plastic and silicone, to be closely resembling natural human beings. The qualitative

leap witnessed by the biotechnological revolution, genetic engineering, nanotechnology, and pharmaceuticals, promises to liberate man from natural inevitability. This idea is present at the heart of the Enlightenment project, but it was emptied of its content when it was limited to its technical aspect and ignored other aspects of life. The human being in our era has become more inclined to demonstrate his ability to adapt than to seek to be freed from most restrictions. Perhaps the best example of this is the project of the cyborg, a human being who is enlarged, and technologically modified in order to demonstrate his ability to adapt to a world saturated with technology. The proponents of the human modification project by enhancing the human body with various technological accessories are paving the way for a new era, the post-human era, an era whose reins are entrusted to a group of scientists, engineers, politicians and experts...This situation is very worrying because the fate of humanity has become unknown! What kind of world do these people want and what values will govern human society? What goals will this human being seek? And who will bear responsibility for the slippages that may result from this project? Questions that must be asked because science no longer stops at certain limits, but rather begins to navigate rough paths and contemporary man must realize the extent of the danger that threatens him. If he wants to continue to exist, and he is the only being who understands the meaning of existence, in the words of Martin Heidegger, he must have a sense of responsibility towards the world, the direction of its kind and all kinds of living beings and the earth. He must realize that the fate of planet Earth depends on ensuring that man cares for the universe and shows solidarity with all living beings, so it is necessary to work to curb the change that violates life. We must return to the moral question, and the necessity of dialogue between what is scientific and moral-philosophical and what is political and religious in order to direct scientific projects towards the good of humanity and the universe as a whole

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