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Cybernetic Organism: An Educative Note

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Abstract -*This study aims to shed light on the debate about the futures of gender, by taking into account its significance in the current development of Artificial Intelligence (AI), cyborg technologies and robotics. Its reflections are sustained by empirical data obtained between November 2010 and January 2011, when the author engaged in a study related to Gender and Artificial Intelligence at the Department of Cybernetics, University of Reading (England) under the supervision of Professor Kevin Warwick, known as the first human cyborg for his experiments "Cyborg I" (1998) and "Cyborg II" (2002). In this context, the author formulated a questionnaire which was answered by more than one hundred students and researchers of the Department. The specific question motivating this research was: how and to what extent do gender and the intersectional differences characterizing the human species inform the development of cyborgs, robots and AI? The results of the questionnaire, presented in this article, offer original and controversial perspectives on how such epistemological approaches may impact the futures.*

Keywords: Cyborg, Enhancement, Real Life, Robot, Organism

1.0 Introduction

In the last century, biology and medicine were transformed through a new collection of biophysics instruments, such as electron microscopes, mass spectrometers and new agents such as radioactive isotopes (Berkowitz, 2012). Advances in computing, semiconductors and microelectronics enabled the development of new fields of in biomedical imaging such as ultrasound, computerized tomography (CT and PET scanners), nuclear magnetic resonance imaging (MRI), and endoscopic surgery (Gore, 2015). These massive changes in biomedicine, together with developments in immunology and pharmacology, enabled radical new ways of intervening in the body, including transplantation of kidneys, hearts, lungs and livers (Wiesen, 2016). These dramatic new ways of remaking and altering the body through genome mapping, genetic engineering, aesthetic surgery and mechanical, electronic and biological prosthetics, have transformation of the collective representation of the embodiment experience (Mallgrave, 2015). As a consequence, the question of technology and the body has become relevant theoretical topic for anthropological, psychological and sociological studies (Southwick, 2014). According to theorists such as Arthur and Marilouise Kroker, the

notion of the body is already obsolete. Consistent with this assertion is the widespread belief that we are on the verge of the "post-body," "post-biological," or "post-human". This view is also shared by the and science historian J. David Bolter, who refers to the late-20th-century human as "Turing's Man" .Post humanists argue for a model of identity that is dramatically altered within technological cultures. In this perspective, western industrialized societies are experiencing a new phase of humanity "wherein no essential differences between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals. Embodiment is seen as an accident of history and consciousness is an evolutionary newcomer". The drive of study is to determine the benefit of cybernetic organism for man's use the result of this study shows the advancement in the development of cyborg with importance, advantages and disadvantages of cyborg.

2.0 The Cyborg

CYBORG, a compound word derived from Cybernetics and Organism, is a term coined by Manfred Clynes in 1960 to describe the need for mankind to artificially enhance biological functions in order to survive in the hostile environment of space. (Barfield, 2015) Originally, a CYBORG referred to a Human being with a bodily functions aided or controlled by technological devices, such as an oxygen tank, artificial heart valve or insulin pump." Over the years, the term has acquired a more general meaning, describing the dependence of human beings on technology. In this sense, CYBORG can be used to characterize anyone who relies on a computer to complete his or her daily work (Rouse, 2016).A CYBORG is a Cybernetics Organism, part human – part machine. This concept is bit tricky but let see an example of a CYBORG: you may have seen a movie "TERMINATOR." In that ARNOLD was a CYBORG. (wittes, 2014) He was part man- part machine. Well definition exactly says this; CYBORG can be made by technology known as CYBERNETICS. "What is CYBERNETICS?" To understand CYBORG, this is the first step that we'll see in the next topic.

2.1 Cybernetics

Cybernetics is word coined by group of scientists led by Norbert Wiener and made popular by Wiener's book of 1948, Cybernetics or Communication in the animal and the Machine (Kiyuna, 2015). Based on the Greek "Kybernetics", meaning steersman or governor, cybernetics is the science or study of the control or

regulation mechanism in human and machine systems, including computers.

CYBERNETICS could be thought of as recently developed science, although to some extent it cuts across existing science (Vijayashree, 2015). If we think of Physics, Chemistry, Biology, etc. as a traditional science, then Cybernetics is a classification, which cuts across them all. Cybernetics is formally defined as the science of control and communication in animals, men and machines. It extracts, from whatever context, that which is concerned with information processing and control. One major characteristics of cybernetics Is its preoccupation with the construction of models and here it overlaps operational research. Cybernetics models are usually distinguished by being hierarchical, adaptive and making permanent use of feedback loops… Cybernetics in some ways is like the science of organization, with special emphasis on the dynamic nature of the system being organized (Susinthra, 2015).

2.2 Real Life Cyborgs

Cyborgs are Cybernetic Organisms. The term was coined in 1960's when Manfred Clynes and Nathan used it in an article about the advantages of self- regulating human-machine systems in outer space (Kiyuna, 2015).

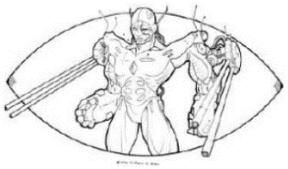

Figure 1 REAL LIFE CYBORGS (Paul A. A., 2010)

The Cyborgs got there fame mainly through the super talented characters in the fiction stories as shown in fig.1 above. A cyborg can be defined as the human being who is technologically complemented by external or internal devices that compliment or regulate various human body functions. Cyborgology is a technical and socio-philosophical study which deals with the development and spreading of the technology to the society (Patella-Rey, 2012).

2.3 Robots & Cyborgs

All of them, to some degree, are programmed; they're basically computers that move. A robot, however, doesn't necessarily have to resemble a human. It can be in the shape of a dog, or a lunar Lander, or one of those giant arms in a car factory. But cyborgs are beings that are part mechanical and part organic. In fact, some theorists consider anyone whose body relies on a form of machinery in order to survive - such as a pacemaker or an insulin pump - to be a cyborg (wittes, 2014).

Figure 2 ROBOTS & CYBORGS (Paul A. A., 2010)

Convenient Cyborgs, Conditional Cyborgs are categorized into two types based on their structural and functional role play as shown in fig. 2 above. Structurally cyborgation can take place either internally or externally. The former convenient cyborgs may refer to any external provision of an exoskeleton for the satisfying the altered fancy needs of body, and the latter Conditional cyborgation includes bionic implants replanting the lost or damaged body part for the normal living in the present environment. There is also different types of cyborgs differentiated as per their body working.

2.4 Hybrots

A Hybrots (short for "hybrid robot") is a cybernetic organism in the form of a robot controlled by a computer consisting of both electronic and biological elements (Rupnathji, 2010). The biological elements are rat neurons connected to a computer chip. This feat was first accomplished by Dr. Steve Potter, a professor of biomedical engineering at the Georgia Institute of Technology. What separates a hybrot from a cyborg is that the latter term is commonly used to refer to a cybernetically enhanced human or animal; while a hybrot is an entirely new type of creature constructed from organic and artificial materials. It is perhaps helpful to think of the hybrot as "semi-living," a term also used by the hybrot's inventors. Another interesting feature of the hybrot is its longevity. Neurons separated from a living brain usually die after a short period of time; however, due to a specially designed incubator utilizing a new sealed-dish culture system, a hybrot may live as long as two years.

2.5 Archetype

The cyborg archetype is a character in a near future world where societal decay has led to the adoption of metal parts. These cyborgs are commonly armed with paramilitary in-built weaponry or are otherwise survival and combat oriented .Some possible scenarios might be:

- The low-life down on Wattson block discover that the Gamma Corp has plans to “renovate” the slum developments by arranging for one of the obsolete orbital refineries to fall out of orbit on it. The characters are a mix of cyborgs and extremely competent humans who are hired/motivated to protect their homes.

- A new virus has been trashing mainframes across the net. There seems to be no defense and very little evidence of how it spreads or how it's getting into the system. The characters are freelance "contractor-cowboys" who have their brains wired for cybernetic net access. They are brought in to track (in cyberspace) a mysterious individual who seems to be somehow connected to virus.
- The characters are a group of vat-grown "clones" that have been cybernetically augmented for mining on Saturn's moons. Now, they've escaped to earth and, nearing the end of their artificially shortened life cycle they must convince their creator/engineer to give them longevity and elude the human assassin/cop who's chasing them.
- Keeping up with the latest modifications takes a lot of money . . . fortunately you can use the just-barely-obsolete-stuff to make money. Especially the weapon pods. Especially in the city

3.0 Methodology

Cyborgs can be built on 75 to 150 points. In a game where cyborgs are legal, others may be allowed to play other. A good median is 100or 125 points. Four Primary Modification Types. There are four primary modification types. These are

3.1 PHY Enhancement (reinforced skeleton)

When the player buys one (or more—but they're pretty expensive) he gains the option to buy some of the Secondary Enhancement Types. For example, a character with a reinforced skeleton can then select Endo-Armor (armor which resides just under the skin), grafted on muscles, and implanted toxin injectors in his fingers as shown in fig.3 below.

The costs for Primary Enhancers are not "a deal" however they give the character the option to buy secondary enhancers that are considerably more cost effective. Weapon Mounts Cyborgs can buy weapon mounts from the Cyborg Weapons List. This list has powerful weapons for a very cheap cost. Weapons from this chart are only legal in games where characters (including cyborgs) can just go down to the local armory and buy and carry weapons. If you are playing with other Archetypes in the same game, the GM should consider the imbalance of missile using Cyborgs vs. Chi Martial Artists (for example).Custom designed weapons are encouraged but the GM should be consulted and asked to determine point cost. Use the weapon chart

sat the end of the section to determine how any given piece of combat equipment fits in (this should not apply to armor—cyborgs must either wear armor or buy it as the listed cybernetic modifications (or both)).The result of this is that cyborg characters are almost invariably over armed. Their attacks do not balance against their armor (they are limited in the amount of armor they can buy).

Thus, as in modern day roleplaying (and modern day real life) combat will be quick and brutal if all parties involved are slinging anti-personnel rockets and high explosive grenades at each other (Paul A. A., 2010).

Figure 3 PHY Enhancement (reinforced skeleton) (Paul A. A., 2010)

- **Cyber-Hand**:

Forget about tool-belts . . . just use your fingers. A cyber-hand gives the character instant access to his most commonly used tools. The kits are: electronic, mechanical, and medical. Each contains a cutting tool (which acts as a +2 damage knife in HTH combat).

- **Fire-Eyes**:

Tired of being looked at funny? Give them something to think about. Fire Eyes glow red in the dark (other colors available) and reduce negative visibility modifiers by 2 points. Best of all they look cool!

- **Designer Skin:**

Designer skin is a genetic-break through. You can have a variety of effects from simply being the first green, purple, blue, or whatever person in your building to adding our genetically sound fur or gills. Forget about leopard-skin underwear . . . get outfitted with some real leopard skin. Moving tattoos and a variety of adjustable "smart designs" can be added.

3.2 Cyborg Skills

This skill is sort of a cross between mechanics and medicine. The character needs equipment most of the time as shown in fig. 4 below. The monetary cost of cybernetics repair depends on the campaign but it is assumed to be similar to auto work (this follows no mathematical model but is good for play balance) (Singer, 2014). Cybernetics that suffered a critical failure must be replaced (GM's option they can be salvaged or at least sold for part of the price). A cybernetic technician must have Electronics and Mechanics at one level lower than this skill.

- **Level 1:**

Beginning Technician. The character can do 'dry' work only (work only on exterior mechanical objects that are basically machines). The character can repair only minor functions of cybernetics which have lost no more than 3 STC. Each hour of work and a successful roll will restore 1 point of STC and the damage points that went with it. A roll is needed to repair each minor function (the exact time is up to the GM--usually around 10 minutes to 2 hours).

- **Level 2:**

Technician. The character can repair or replace most types of cybernetics. The character etc. There pair times as above are halved but the character is at a cumulative-1 for each point of STC lost above 3.

- **Level 3:**

Expert Technician. The character can repair wet cybernetics (those inside the body) and gets +3 to all repair rolls dealing with dry work (cybernetic limbs).

- **Level 4:**

Master Technician. The repair times are quartered and the character gets +3 on wet work, +6 on dry work. The master can work without proper equipment (usually at a -5—some things can't be repaired without equipment. The master gets a roll to repair even critically damaged cybernetics.

Figure 4 Cyborg Skills (Paul A. A., 2010)

Reinforced Physiology

The cyborg has had its internal systems upgraded to with stand exceptional damage. Arteries are reinforced with micro-strands of polymer, lymph fluid is enhanced along with biological blood additives to reduce bleeding and speed recovery. Layers of internal "smooth muscle" are augmented to withstand physical stress far in excess of the norm without failing as shown in Table 1. The CON roll + only applies to healing rolls, disease and toxin resistance rolls, rolls to stop bleeding, and POWER vs. STAT attack rolls. It does not apply to wound rolls of any sort.

Table 1. Reinforced Physiology (Paul A. A., 2010)

Reinforced PHY	DP	+ to CON rolls	BLD	Requires	Cost
Mark I	+16	+0	+4	Mk 1+ Skeleton	20
Mark 2	+32	+1	+8	Mk 2 + Skeleton	40
Mark 3	+64	+2	+16	Mk 3 Skeleton	80

3.3 REF Enhancement (hard wired nerves)

Biological nerves are slow: chemical bridges are built to transmit electrical impulses through tissue. This can be

improved upon—the nerve trunks can be replaced with spun glass and electrical switch junctions as shown in fig.6 below. The clocks in the brain that control reaction speed can be upgraded with "wetware" patches to give the recipient quicker reflexes. Reflex "loops" which control automatic responses (like pulling one's hand back from a hot surface) can be upgraded to "smart reflexes" where the character takes other actions dependent on the situation. Hardwired reflexes give the character a higher REA score and an even higher initiative roll. The Initiative bonus is given in addition to the higher REA (so Mark 1 Hardwired Reflexes gives the character+5 to his initiative rolls but only +3 actual reflexes.)Enhanced Ground Speed The internal "clock" which determines how fast a life form runs can be cybernetically adjusted. The character will have a higher groundspeed. The plus to ground speed will be added to sprint, 2/3rds of it will be added to running speed, and 1/3rd of it will be added to walking speed.

3.4 INT Enhancement (mind-computer interface jack

- **Communication Technology:** A cyborg with neural cybernetics can tap into the data streams around him. This can allow him to make untraceable calls, tap into other's streams, and evade detection. These pieces of cyber-gear don't require Neural Jacks or any other piece of tech.
- **Radio:** The character can broadcast and receive on several bands. The character can receive both "citizens band" and local AM/FM stations. Cost is +0.
- **Cell Phone / Modem:** The character can hook into the world's phone net if a receiving station is within range. The phone acts as a "normal" modem. Cyber phones are assumed to do conference calls and have all the modern amenities. Cost is +0
- **Fast Modem:** This acts like phone and as a "fast" modem. The GM must determine what fast is but it should be significantly faster than a normal modem (modern day this would be 128K vs.57K). Cost is+1
- **Tight Beam Radio:** So long as the receiving character is in range and the sender knows exactly where he is (i.e. can see him or is in contact) the signal can't be intercepted unless the intercepting character gets between the sender and receiver. This is a favorite of troops and tightly knit teams

3.5 Enhanced Prosthetics (metal body parts)

Figure 5 Enhanced Prosthetics (metal body parts) (Paul A. A., 2010)

4.0. Applications of Cybernetic Organism

4.1 In Medical Field

In medicine, there are two important and different types of cyborgs: these are the restorative and the enhanced as shown in fig.7 below. Restorative technologies "restore lost functions, organs and limbs". The key aspect of restorative cyborgization is there pair of broken or lost processes to revert to a healthy or average level of function (Dokko, 2015). There is no enhancement to the original faculty and processes that were lost. The enhancement cyborgation follows the Principle of Optimal performance: maximizing the output with minimized input. Thus, the enhanced cyborg intend to exceed normal processes or even gain new functions that were not originally present (Dokko, 2015). Wiring the brain with "sockets" into which pieces of hardware can be attached is the next frontier of human-computer interface. The basic neural jack involves (depending on the GM's view of the technology)creating a channel in the brain which opens to an outside interface port and connects on the inside to a "patch" which consists of fiber-optics, neural-net logic-gate arrays, and biological tissue. The basic jack allows different attachments from "skill-chips" to computer targeting systems. The patch brings some functions of the brain up to computer like speeds as the wearer learns to "formulate questions" in such a way as to use the patch's high-speed processing power. At the basic level the patch can only be used to solve math problems extremely quickly (and then, only if the character has Level 2 or higher Mathematics skill—otherwise that virtue will be wasted). Additionally, the patch gives the character an effectively higher RES for computer skill. Many cyberpunk games feature a sort of virtual-reality Internet where people can interact, work with data in 3d, and hack with "hunter-hunted" paradigms. It is beyond the scope of these rules to completely specify all the possibilities for these, however if the game world includes this development (indeed, the real world may include some version of it within 50 years) then a neural jack is all that is required to access it.

- **Skill Chip Slot**

A skill chip is a database coupled with "natural language query hardware" which fits into a chip slot. The chip slot requires a neural jack. Once a character is fitted he can buy skill chips (usually sold on the open market) and simply insert the chip to know the skill. A chip usually contains a MEM or RES based skill at Level 2proficiency or it can contain a database of a specific sort holding several Gigabytes of data on some topic (mixed drinks, classic cars, rules of card games). Some very rare and super expensive chips contain Level 3 skills. These take two slot locations. The skills

themselves exist in the interconnections of a chemical matrix within the chip housing—copying them has proven impossible: each must be taken from a live human and is a time consuming process. Most skills on chips have a 13- or lower roll (even if the "donor" had a higher roll).The type of jack determines what level the skill can be used at (a Mark 1 jack will only allow the skill to be used at Level 1 regard less of the level on the chip). The jack type also determines the speed of extraction. A Mark1 jack retrieves data at close to the speed of reading—but higher-grade jacks make the use much more natural.

Figure 6 MEDICAL FIELD IN (Solanki, 2015)

4.2 In Military

In defensive applications the Cybernetics and Cyborgological experiences are held for the development of "Cyborg soldier" (Kumar, 2010). The cyborg soldier often refers to a soldier whose weapons as well as the survival systems are integrated into the self, creating a human-machine interface as shown in fig.8 below (Sharma, 2012). Military organizations research has recently focused on the utilization of cyborg animal. DARPA has announced its interest in developing "cyborg insects" to transmit data from sensors implanted into the insect during its pupal stage. The insect's motion would be controlled from a Micro-Electro-Mechanical-System for detecting the presence explosives and Gas (Jazeel, 2014). DARPA is also developing neural implant to remotely control the movement of sharks. Powered Exoskeleton is another proposed product from Cyborgology for military purpose, which combines a human control system with robotic muscle (Amit, 2016).

Figure 7 IN MILITARY (Solanki, 2015)

4.3 In Sports

Prosthetic legs and feet are not advanced enough to give the athlete the edge, and people with these prosthetics are allowed to complete, possibly only because they are not actually competitive in such –Athlons as shown in fig. 9 below. Some prosthetic leg and feet allow for runners to adjust the length of their stride which could potentially improve run times and in time

actually allow a runner with prosthetic leg to be fastest in the world. (Schulman, 2012)

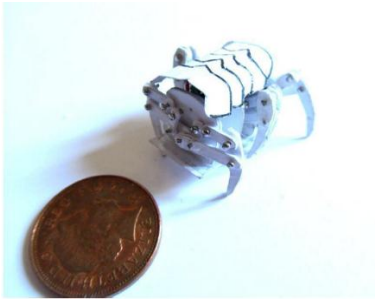

Figure 8 IN SPORTS (Solanki, 2015)

4.4 In Art

The concept of cyborgation to associate to most people with science fiction, they tend to believe cyborgs exist only in imaginations of writers and artists as shown in fig. 10 below. Cyborgs get famed through mainly science fiction films and through stories of writers (Sharma, 2012).

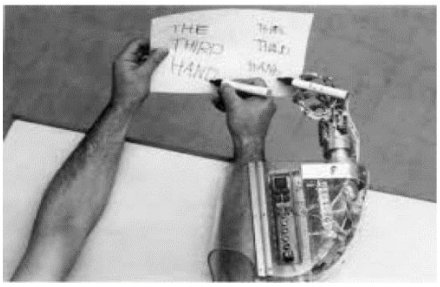

Figure 9 IN ART (Solanki, 2015)

4.5 In Popular Culture

Cyborgs are become a well-known part of science through fiction literature and other media. In fig.11 below the Examples of famous organic–based fictional cyborg include Terminator, Star war's etc. Mechanical based models include Replicates and Cylons (Ruben, 2012).

Figure 10 IN POPULAR CULTURE (Solanki, 2015)

4.6 Advantages and Disadvantages

Whether it be a new emerging technology, a new instrument or anew equipment, proper use of equipped devices & the technologies. So, here are the set of advantages and disadvantages of CYBORG (Hayles, 2015).

4.7 Advantages:

- The human cyborg represents a 'transitional species' of sorts, before the human enters total post-biological obsolescence.
- If evolution is theorized from an abstract perspective as an attempt to increase the information processing power latent in matter, in the struggle against entropy, it is clear that artificial life will eventually win out against organic life since it is more durable and more efficient.
- These extropians see this as perhaps bad news for the human race, but in the long term at least good news for

the planet and apparently the universe.

There are others who foresee perhaps a more peaceable coexistence for human beings and electronic 'life', however. one recent theory that has been bantered about lately is that the human race may have reached the saturation point for economic growth, but this is fortunate since it has arrived in time for it to work on 'human growth', i.e. the re-engineering of the human species.

We can 'graduate ' from being victims of natural selection to masters of self-selection. It seems hard to argue against increasing human longevity, intelligence, or strength, since human beings seem to live too short a span, to make too many mistakes in reasoning, and to lack the physical endurance necessary to make great accomplishments.

Lastly, there are the postmodern theorists, normally noted for their anti-technological stance, who have taken a favorable position on the coming of the cyborg.

4.8 Disadvantages

The critics of bioelectronics and Biocomputing foresee numerous potential negative social consequences from the technology. One is that the human race will divide along the lines of biological haves and have-nots.

People with enough money will be able to argument their personal attributes as they see fit as well as to utilize cloning, organ replacement, etc. to stave off death for as long as they wish, while the majority of humanity will continue to suffer from hunger, bad genes, and infirmity (Paul S. , 2013).

Certainly, it would be easy to utilize bio-implants that would allow people to trace the location and perhaps even monitor the condition and behavior of implanted persons.

This would be tremendous violation of human privacy, but the creators of human biotech might see it as necessary to keep their subjects under control. Once implanted with bio-implant electronic devices, 'cyborg' might become highly dependent on the creators of these devices for their repair, recharge, and maintenance (Paul S. , 2013).

It could be possible to modify the person technologically so that body would stop producing some essential substance for survival, thus placing them under the absolute control of the designer of the technology (Sharma, 2012).

Even those not spiritually inclined who still nevertheless possess the feeling that there is something within humanity which is not found in animals or machines and which makes us uniquely human, worry that the essence of our humanity will be lost to this (Fieser, 2016).

5.0 Conclusion

Humans have limited capabilities. Humans sense the world in a restricted way, vision being the best of the senses. Humans understand the world in only 3 dimensions and communicate in a very slow, serial fashion called speech. But it must get improved for the human beings to exist in this competitive world. Only technology can make it possible. And Cyborgology is the future technology for the purpose to be get real. Even it has some major defects and wrong sides as like any technologies evolving now days. Finally I would like to say that if the future of intelligent robots, then to protect mankind, we will must need some TERMINATORs. They all are CYBORGS. Because by making human CYBORGS, we may have the following extra ordinary capabilities…. We will be able to communicate between each other by thought signals alone, so no more need for telephones, old fashioned signals, we all are able to think to each other via implants. Instead of communicating by speech as we do presently, we will be able to think to each other, simply by implants connected to our nervous system linking our brains electronically together, possibility even over the internet. We won't need the languages that we presently do, we'll need a new language of ideas and the concepts in order to communicate thoughts from brain to brain. The implementation of this cyborg technology would bring about the change in the complexity of normal labour life to give human a better advantage physically. A tiny digital video camera replaced the eyes of a blind man, brain stem and cochlear implants enable deaf people to hear again.

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