HUMAN EXTENSIONS VS. HUMAN EXPANSIONS

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Many philosophers dichotomizing the mind and the body have considered the body to be a hindrance to the production of knowledge and a source of "interference to operations of reason"(Grosz, pg.4). In “Flesh and Stone”, Senett depicts our society's idea of "pleasure" as experiences of minimized bodily stimulus and emphasizes how ardent we are to weaken our tactile realities(1994, pg.17). As experiencing tactile realities requires motor output and energy consumption for the organism, one can assume that the dismissal of the body by the mind is a natural result of the evolutionary quest for energy efficiency of organisms. Throughout history, the key driving force in the development of any mechanism, including the human machine, has been efficiency. The primary origin of the penchant for this has its roots back in the idea that any organism that can hunt, escape predator and achieve goals with minimal loss of metabolic energy has higher chances of survival, hence evolutionary advantage.(Peters, pg.8) It is also suggested by Peters that consciousness has evolved much later than motor abilities, only to improve energy efficiency in social and natural interactions, as an alternative gear to motor output. According to this, one can assume that it is natural for human beings to amputate their bodies at times, allowing the mind to serve the body’s ardent for ease. Further in this essay, the technologies developed for accommodating this “energy saving” mode will be analyzed. In doing so, one will find that very few of these technologies manage to only ease bodily labor, but also start easing labors of the mind. At a time when virtual reality pioneer Balienson is heralding a future world “with no putrid smells but only delightful ones, where it rains only when you are inside, and where global warming is actually just a myth” a world where “your great-grandfather is still around and can play catch with your six-year-old daughter.” (2011,pg.12), all within virtual spaces we will occupy through the avatars we can wear, one cannot help but wonder, will humanity find an equilibrium when emotional labor is cancelled out along with physical labor and will such approach of outsourcing our labors actually mean advancement?

The most direct application of the human mind’s endeavor for energy efficiency begins with its metabolic regulations and the motor regulations. As mentioned earlier, the consciousness and the architecture of our cognition feed-back loops, particularly the content relating to self-orientation, self-location and self-awareness, are mechanisms designed for this purpose. These mechanisms regulate our actions in relation to the interaction of our spatiotemporal state and our desired states, in order to achieve a homeostasis, both physiologically and phenomenologically. The cognitive system works similar to the growth of a photosynthetic plant being regulated by the light sensitive proteins which

distinguish the shortest path in the direction of the light, in order to accommodate minimum energy expenditure in comparison to the energy that is to be gained from the photosynthesis. Peters emphasizes the critical role of the brain in the relation of action and homeostasis by stating “cognitive systems can thus be viewed as managers, not simply of ongoing homeostatic balance, but of the energy budget available to maintain that balance through action.”(2009,pg.8) The evolutionary sequence throughout the development of our cognitive feedback (or feed-forward) loops are evidence to this energy efficiency mode. While the most primitive self-regulation systems of our cognition exercised a feedback loop between sensory stimulus and the energy-expensive motor outputs directly, the further developed regulation systems of our behavior introduced the elimination of a motor output through what is called a recursive feed-forward loop. (Cisek,1999) The feed-forward loops involve reactions to anticipated stimulus as much as perceived present stimulus, leading to the elimination of corrective motor-outputs during changing external factors. Prescott, Redgrave and Gurney exemplify this evolved mode with the anticipation of danger in a situation leading to predictive feed-forward reaction resulting in complete avoidance; meaning zero motor output. (1998, pg.18) While such anticipatory behavior sounds very basic for us humans, it is the basis of our survival in the energy-efficiency test of the universe. Through easing our bodily labors, in this example we begin to see an establishment of a symbiotic balance between the labor of the mind and the labor of the body.

Further in history, humanity has this endeavor of economical use of energy engraved in many different areas of life, one very crystallized example being the 19th and 20th century industrial production system developments’ dominant principle of assembly lines and the scientific management of the production processes. The main focus of these developments has been the removal of the human(worker) body’s mobility within the process, as this part of the production seemed to be the least time efficient step in terms of productivity. As time meant production and production meant profit, the removal of such steps from the production became essential. This idea was first executed by removing the time spent while a worker switches from one task to the other. In doing so, each worker would be assigned a specific task, for the completion of the whole process. Further on, the workers’ mobility was reduced through mechanization of the conveyance of goods, namely with Bodmer’s inventions in 1830s, such as the travelling overhead crane and the conveyor belt which carried the goods to be processed onto the respective workers’ worktops. While these inventions provide ease for the body, reducing the difficulties of the process such as carrying heavy hogs (in the case of the slaughterhouse Bodmer designed), the primary aim of these inventions were purely economic. (Giedion,pg.100) Finally at the latest stage of the energy efficiency development of the assembly line production, a management system that resonates the consciousness-motor output feed-forward loop of human body emerges as Frederick Winslow Taylor introduces the idea of scientific management. The basic method applied here is

dividing the labor between management and operatives, where the operatives act as the motor output vessels of the organism while the management acts as the evaluation unit analyzing the efficiency of every movement of the worker, dictating which parts of their actions are efficient and which parts should be corrected. This analytical feed-forward system was conveyed through experiments with some of the best workers of the factory and with the aid of the cyclograph's invention, which allowed the movements of the workers be recorded over time, systematically capturing the less time-efficient moments of their movement. Taylor indicates that the priority of his invention is easing of the bodily labor for the sake of functional performance. However, what is called "easing of the body" here corresponds to stretching the capacity of the body to its maximum by using it in optimal intensity; as Gideon has also emphasized.(1948, pg.98) The separation of the "mind" of the organism(the factory) from the "body"(the workers), hinders any mode of initiative or impulse that may be applied to actions of the body, leaving the body fully automatized, and the mind numbed as the circuit between the management and operatives is broken; hence abolishing the chances of learning from experience in order to project onto future anticipations for the regulation of his own movements.

The replacement of the regulatory systems and the deprivation of bodily movements through the compensation of machines is not the only mode of energy efficiency developed through our history. The tackling of this endeavor has been manifold, a different approach being the dismissal of body's [senses'] use as the primary information collector. Since early history, humanity has developed many technologies to substitute body's role as the main "reality portal", ensuring the body's comfort, on journeys that would be challenging to go on physically. In the 1800s, immersive cylindrical panorama paintings have been used to have the minds travel to the war stories, without being in the war, as in the example of Riesenrundgemälde portraying the battle of Bergisel; in the 15th century, it was the Baroque trompe l'oeils creating visual portals to paintings of heaven or hell. The latest and the ultimate technology developed for this ambition of exempting the body from its responsibilities is the virtual reality technologies immersing our senses with artificial media, allowing us to virtually visit places we would not be able to go physically, perceiving ourselves doing thing we would never do. However, these technologies that initially were invented for easing of our "bodily" responsibilities, or avoiding putting the body in risk, have developed into much more than their initial aim, not only altering where the body can go logistically but also alter how one perceives the reality of his/her own body.

The earliest use of virtual reality in the terms we understand it today, by means of immersion into digital audio/visual environments, navigated through minimized motor reactions of the body were in vehicle simulations. However, these functional testing simulations took a different form during early years of World War II, as they were used in the military to increase the chances of a fighter pilot's survival in the actual combats.(Ihde, pg.9) The military's tactic was based

on the hypothesis that a fighter pilot's likelihood to survive the air battles throughout his career would increase if he wins five fights at the beginning. This idea, that resonates with the uses of mental time-travel to the future and the anticipations of a feed-forward circuit, introduces a new level of efficiency in the quest for survival. In addition to time efficiency and energy efficiency, risk efficiency is involved with this procedure. This development brings to mind Giedion's comparison of the factory worker controlled by the scientific management to the soldiers under orders of their seniors. Though he was dignifying soldiers in this comparison, claiming that their actions required initiative and moral impulse reactions under pressure, we start to see the beginnings of how humanity has managed to make such features of our nature become redundant, as the air fighter's reactions start to get pre-programmed through the simulation. While our impulses are meant to be regulated by anticipation of possible danger or fear caused by projections of prior stimuli and experiences, the synthetic substitution of a real experience that has real consequences may lead to the loss of a humane judgment. These simulations keep the mind-sense-motor-output circuit relatively intact, though motor output being limited to hand-eye coordination only, allowing the experience to be as real as possible in technical terms, hence educative for a battle in the mechanical sense. However, one can see that there is a psychological augmentation in such synthetic victories, since they alter how the fighter pilot perceives himself and consequently his confidence would be amplified. Evidence of the effects of one perceiving the self-image performing a desired behavior, increasing the chances of him actually fulfilling that perceived behavior is witnessed in experiments done with selectively mute children who were not able to speak at school. In these experiments first done in the 70s, the children who would not speak in social contexts, would be shown edited videos of themselves speaking, with a classroom backdrop artificially augmented in the video, leading to the child learning from his future projection and hence performing adaptive behavior. Though the adaptive behavior can be seen as a positive consequence, resembling a humane reaction, what is concerning is the fact that the adaptation is pre-programmed by an external source. A different proof of the synthetic experience inducing alterations on the user's psyche is presented by Ihde as he compares his own behavior and his son's while playing a video game called Flight Simulator; himself being someone who is introduced to virtual reality later in his life, as opposed to his son who has experienced a large portion of his life through virtual reality :

"I was stressed when I got lost over an Iowa cornfield and ended in a crash. Mark enjoys deliberately smashing into Chicago's tall buildings on takeoff and then repeating, with the disembodied perspective, the scenes of the crash from the quasi-distance of that perspective, as the plane parts fall to earth. " Lives" after all, are infinitely repeatable in virtual reality." (2002, pg.10)

A different example that uses similar technologies is a version that aims to alter

the mind's perception of its host body, altering how the user perceives the physical reality. The kind of virtual environment Perkins refers to as, one that "can build a better you, one false "reality" at a time."(2009) In Jeremy Balienson's Virtual Human Interaction Lab in Stanford University, a group of volunteers were given avatars of a various range of attractiveness and allowed to experience a virtual space through a head mounted display with sensors transferring the users behavior back into the virtual reality. After a period of occupying the virtual with the new altered perception of their own body, the users' behavior were observed to be altered in real life. According to the results of the test, users with more attractive avatars began acting more confident, choosing more attractive mates in online dating websites, while volunteers with less attractive avatars were showing more anti-social behaviors. (Perkins, 2009) What this lab test exemplifies is a use of the technology which encourages alteration of one's reality of his/her own body, instead of the induction of adaptation of the psyche to the body. Placing the mind in a virtual simulation of social interactions allows to keep the body in a safe zone. Proxemic studies corroborate that people are more threatened when other people enter their physical personal space, hence the lack of a shared physical space reduces the risks exerted on the body during social interaction. However, what is alarming in this example is the fact that it is not just the body that has been eased from its duties but also the mind. As the mind is handed an avatar it will feel more comfortable in, it is suspended from its duties of coping with the reality of their own body. As harmless as this may seem, considering it is a test done in a controlled laboratory environment and the participants' bodies have returned to their physical reality duties afterwards, it is hard to imagine that such possibilities will be hidden in a lab for a lot longer.

On a different end of the spectrum of augmenting the capabilities of the human machine, one wishes to imagine an alternative to the segregation of our cognitive system and outsourcing parts of its tasks, similar to an assembly line approach. Jaron Lanier, who has coined the term "virtual reality" in the 80s, seems to have come across examplary uses of virtual reality that indicate some hope in this direction. In the experiments of Kinect controlled avatars he has been working on, he is testing what he calls "the homuncular flexibility". These examples test the mapping of body parts' movements to avatar creatures which have more limbs than the human body, such as crustacean bodies with 8 limbs, or the avatar body of a complex molecule; all in an attempt to test the flexibility and adaptability of our homunculus [the part of the brain where each of our limbs' are mapped in order to control our motor actions]. Such experiments are laden with the expansion of the potential that our body-mind circuit bears. Lanier articulates the potential of such use of the body as a tool for addressing complexities with a metaphor to a person who is playing an instrument, resolving a complex pattern of a musical piece through his fingers, even though he may not have been able to

comprehend this pattern with his conscious mind.(2010) In these tests, the human mind is handed a new tool to adapt to and learn from, instead of a tool that directly serves what is desired. What this provides is the protection of the integrity of the human cognitive system yet a more ambiguous use of this system leading to fruitful adaptations, which in turn can yield in an expansion of its capabilities rather than mere efficiency.

As seen through the progression of examples above, the human civilization is undoubtedly becoming more and more efficient on a broad spectrum of aspects, such as time efficiency, energy efficiency and risk efficiency; further easing our somatic and cognitive labors. However this progression also exhibits how the human specie is slowly removing many of its adaptability traits integrated in the regulations of the cognitive circuits; be it the senses, the bodily labors or the labors of the mind; leaving all adaptation responsibilities to the machines and the reality generators we let into our lives. This loss of the ability to adapt within our cognitive-sensory-motor circuit foreshadows the loss of all the privileges mankind has had for their evolutionary survival, yet there seems to be hope of an alternative to this approach of outsourcing every task that challenges our efficiency with a direct and non-creative replacement of it, and the human body seems to be the key element in that alternative.

Bibliography:

Bailenson, Jeremy & Blascovich, Jim. Infinite Reality: Avatars, Eternal Life, New Worlds, and the Dawn of Virtual Revolution, New York: Harper Collins Publishers, 2011.

Cisek, P. (1999) Beyond the computer metaphor: Behaviour as interaction. Journal of Consciousness Studies, 6, No. 11-12, pp. 125-42

Corballis, C. Michael & Suddendorf, Thomas(2007). The Evolution of Foresight: What is mental time-travel and is it unique to humans? Behavioral and Brain Sciences, 30; 299-351. doi: 10.1017/s0140525x07001975.

Giedion, Siegfried. Mechanisation Takes Command, New York: Oxford University Press, 1948.

Grosz, Elizabeth A. Volatile Bodies: Towards A Corporeal Feminism, Indiana: Indiana University Press, 1994.

Ihde, Don. Bodies in Technology, Minneapolis: University of Minnesota Press, 2002.

Lanier, Jaron. On the Threshold of the Avatar Era. The Wall Street Journal. 23 October 2010. Web. 8 December 2013.

Lanier, Jaron. You are not a gadget. New York: Alfred A. Knopf, Inc., 2010.

Peters, Frederic(2009). Consciousness as Recursive, Spatiotemporal Self-Location. Nature Precedings. 23 October 2009. Web. 11 December 2013.

Perkins, Ken Parish(2009). Reality Bytes. American Way. 1 February 2009. Web. 12 December 2013.

Prescott TJ, Redgrave P, & Gurney K (1998). Layered control architectures in robots and vertebrates. *Adaptive Behavior* 7(1), 99-127.

Sennett, Richard. Flesh and Stone: The Body and the City in Western Civilization, London: W.W.Norton & Company Ltd., 1994.