Homo Electricus and the Continued Speciation of Humans

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INTRODUCTION

When Jacques Ellul (1964, p. 432) predicted the use of "electronic banks" in his book, *The Technological Society*, he was not referring to the computerisation of financial institutions or the use of Automatic Teller Machines (ATMs). Rather it was in the context of the possibility of the dawn of a new entity- the *coupling of man and machine*. Ellul was predicting that one day knowledge would be accumulated in electronic banks and "transmitted directly to the human nervous system by means of coded electronic messages… [w]hat is needed will pass directly from the machine to the brain without going through consciousness…" As unbelievable as this *man-machine* complex may have sounded at the time, forty years on visionaries are still predicting that such scenarios will be possible by the turn of the twenty-second century. Michio Kaku (1998, pp. 112-116) observes that scientists are working steadily toward a brain-computer interface. The first step is to show that individual neurons can grow on silicon and then to connect the chip directly to a neuron in an animal. The next step is to mimic this connectivity in a human, the last is to decode millions of neurons which constitute the spinal cord in order to interface directly with the brain. Cyberpunk science fiction writers like William Gibson (1984) refer to this notion as "jacking-in" with the *wetware*; plugging in a computer cable directly with the central nervous system (i.e. with neurons in the brain analogous to software and hardware) (Gates, 1995, p. 133).

In terms of the current state of development we can point to the innovation of miniature wearable media, orthopaedic replacements (including pacemakers), bionic prosthetic limbs (Davis, 2006), humanoid robots, and radio-frequency identification implants (Jones, 2006). Traditionally the term *cyborg* has been used to describe humans who have some mechanical parts or extensions. Today however we are on the brink of building a new sentient being, a bearer of electricity, a modern man belonging to a new race, beyond that which can be considered merely *part man part machine.* We refer here to the absolute fusion of man and machine, where the subject itself becomes the object; where the *toolmaker becomes one with his tools* (McLuhan, 1964). The question at this point of coalescence is how human will the new species be (Toffler, 1981); and what are the related ethical concerns? Does the "evolution" of humans as recorded in history, end when technology can be connected to the body in a wired or wireless form?

FROM PROSTHETICS TO AMPLIFICATION

While orthopaedic replacements corrective in nature have been around since the 1950s (Banbury, 1997) and are required to repair a function that is either lying dormant or has failed altogether, implants of the future will attempt to add new functionality to native human capabilities, either through extensions or additions (figure 1). Kevin Warwick's Cyborg 2.0 project for instance, intended to prove that two persons with respective implants could communicate sensation and movement by thoughts alone. In 2002, the BBC reported that a tiny silicon square with 100 electrodes was connected to the professor's median nerve and linked to a transmitter/receiver in his forearm. Although, "Warwick believe[d] that when he move[d] his own fingers, his brain [would] also be able to move Irena's" (Dobson

2001, p. 1), the outcome of the experiment was described at best as sending "morse-code" messages. Warwick (2003) is still of the belief that a person's brain could be directly linked to a computer network. Commercial players are also intent on keeping ahead, continually funding projects in this area of research. IBM's Personal Area Network (PAN) prototype transmitter, showed the potential to use the human body's natural salinity as a conductor to sending or receiving data electronically. While the devices used were wearable, it showed that as many as four people could exchange electronic messages simply by shaking hands (Scannell, 1996).

THE SOUL CATCHER CHIP

The *Soul Catcher* chip was conceived by former Head of British Telecom Research, Peter Cochrane. Cochrane (1999, p. 2) believes that the human body is merely a *carcass* that serves as a *transport* mechanism just like a vehicle, and that the most important part of our body is our brain (i.e. mind). Similarly Miriam English has said "…I like my body, but it's going to die, and it's not a choice really I have. If I want to continue, and I want desperately to see what happens in another 100 years, and another 1000 years… I need to duplicate my brain in order to do that" (Walker, 2001). Soul Catcher is all about the preservation of a human, way beyond the point of physical debilitation. The Soul Catcher chip would be implanted in the brain, and act as an access point to the external world (Grossman, 1998). Consider being able to download the mind onto computer hardware and then creating a global nervous system via wireless Internet (Fixmer, 1998). By 2050 Cochrane has predicted that downloading thoughts and emotions will be commonplace (LoBaido, 2001). Billinghurst and Starner (1999, p. 64) predict that this kind of arrangement will free up the human intellect to focus on creative rather than computational functions.

Cochrane's beliefs are shared by many others engaged in the *transhumanist* movement (especially Extropians like Alexander Chislenko). Marvin Minsky believes that this would be the next stage in human evolution; a way to achieve true immortality "replacing flesh with steel and silicon" (Kaku, 1998, p. 94). Chris Winter of British Telecom has claimed that Soul Catcher will mean "the end of death." Winter predicts that by 2030: "[i]t would be possible to imbue a new-born baby with a lifetime's experiences by giving him or her the Soul Catcher chip of a dead person" (Uhlig, 2001).

THE RISE OF THE ELECTROPHORUS

The human who has been implanted with a microchip that can send or receive data, is an *Electrophorus*, a bearer of "electric" technology (Michael & Michael, 2005). One who "bears" is in some way intrinsically or spiritually connected to that which they are bearing, in the same way an expecting mother is to the child in her womb (figure 2). The root *electro* comes from the Greek word meaning "amber," and *phorus* means to "wear, to put on, to get into" (Michael & Michael, 2006, p. 635). To electronize something is "to furnish it with electronic equipment" and electrotechnology is "the science that deals with practical applications of electricity." The *Macquarie Dictionary* definition of electrophorus is "an instrument for generating static electricity by means of induction." The term "electrophoresis" has been borrowed here, to describe the 'electronic' operations that an electrophorus is involved in. McLuhan et al. (1995, p. 94) believed that "…electricity is in effect an extension of the nervous system as a kind of global membrane." He argued that "physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn finds ever new ways of modifying his technology" (Dery,

1996, p. 117). McLuhan called this process “auto-amputation”, the idea of extending oneself to become the complete person again.

The term electrophorus seems to be much more suitable today than that of any other term, including that of cyborg. It is not surprising then, that these crucial matters of definition raise the metaphysical question of identity, which science fiction writers are now beginning to creatively and in some instances to ontologically address. The Electrophorus belongs to the emerging species of *Homo Electricus*. In its current state the Electrophorus relies on a device being triggered wirelessly when it enters an electromagnetic field. In the future the Electrophorus will act like a network element or node, allowing information to pass through him or her, to be stored locally or remotely, and to send out messages and receive them simultaneously and allow some to be processed actively, and others as background tasks (figure 3).

At the point of becoming an Electrophorus (i.e. a *bearer* of electricity), Brown (1999), makes the observation that “[y]ou are not just a human linked with technology; you are something different and your values and judgment will change”. Some suspect that it will even become possible to alter behavior in people with brain implants, whether they will it or not. Maybury (1990) believes that “[t]he advent of machine intelligence raises social and ethical issues that may ultimately challenge human existence on earth.” We know, for example, from the reports of the clinical psychologist Michael Yapko (1998) that a procedure under clinical investigation called *Vagus Nerve Stimulation*, refers to a “pacemaker for the brain” which has been used to treat depression by sending electrical impulses to stimulate those parts of the

brain which are considered “the underperforming areas.” This, of course, raises the alarmingly obvious questions of the potential for ‘mood’ and ‘mind’ control.

THE ETHICAL CONCERNS

Warwick is well aware that one of the major obstacles of *cyber-humans* and bio-electric humans are the associated moral issues- who gives anyone the right to be conducting complex procedures on a perfectly healthy person, and who will take responsibility for any complications that present themselves?(Smith, 2002) D.M. Rummler (2001) asks whether it is ethical to be linking computers to humans in the first place and whether or not limitations should be placed on what procedures can be conducted even if they are possible. For instance, could this be considered a violation of human rights? And moreover what will it mean in the future to call oneself “human”? McGrath (2001) asks “how human?” Do we determine our ‘humanity’ by the number of synthetic or mechanical parts we have willingly invited into our body? Rushworth Kidder questions the general area of research: “are some kinds of knowledge so terrible they simply should not be pursued?” Kidder believes we are heading for a philosophical crisis and that the root cause lies in the chasm between three domains that are hardly on speaking terms- technology, politics and ethics. With reference to Kurzweil’s prediction of humans merging with robots, Danny Hillis predicts that the change would happen so gradually that we would sooner or later get use to it as if it had been there all along (Joy, 2000). In the wearable computing realm, Steve Mann (1997, p. 31) uses an analogy to express this same idea: “[s]omeday, when we’ve become accustomed to clothing-based computing, we will no doubt feel naked, confused, and lost without a computer screen hovering in front of our eyes to guide us”, just like we would feel our nakedness without conventional clothes today.

Warwick too remarked about his Cyborg 1.0 implant, “I don’t see it as a separate thing [the implant]… It’s like an arm or a leg” (Witt, 1999). There is an underlying theme of control here- the partnership between man and machine will always be disproportionate. The machine in the Electrophorus scenario, though given breath by man, is still the more dominant member. It cannot be held accountable for malfunction, including viruses, and for this reason ‘traditional’ humanity will always be at the mercy of the machine. Homo Electricus is at a greater risk than its predecessors in terms of natural selection, as it cannot exist without a man-made power source. It will also to some degree, rely on the ‘have nots’ or those who ‘opt out’ of a virtual existence, as the key to its continuum.

WHERE TO NEXT?

You could be forgiven for thinking that the *human-computer* metaphor belongs to science fiction but the evidence is there that it is certainly not *just* science fiction (Keiper, 2006; Davis, 2006). When well-known universities in North America and Europe fund brain implant projects and large multinational companies support ideas like the Soul Catcher chip and sponsor cyborg experiments, and government departments like DARPA and NASA discuss future possibilities openly, we can be assured that this is not science fiction but increments of science fact. McGrath (2001) alludes to the German poet Rainer Maria Rilke who makes the observation that the “future enters into us long before it happens.”

Science fiction writers and directors, whose predictions are sometimes denigrated or altogether discounted by “professional scientists,” have helped to put some form to forecasts by the use of print, sound and visual mediums, especially in novels and

motion picture. Some of the more notable predictions and social critiques are contained within the following works: *Frankenstein* (Shelley 1818), *Metropolis* (Fritz Lang 1927), *Brave New World* (Huxley 1932), *1984* (Orwell 1949), *I, Robot* (Asimov 1950), *2001: A Space Odyssey* (Clarke 1968), *Blade Runner* (Dick 1968), *THX-1138* (George Lucas 1971), *Neuromancer* (Gibson 1984), *Total Recall* (Paul Verhoeven 1990), *The Silicon Man* (Platt 1991), *Johnny Mnemonic* (Robert Longo 1995) (figure 4). Forecasts are important because they "do not state what the future will be… they attempt to glean what it might be" (Braun, 1995, p. 133) and for that matter, futuristic-type works help us to understand trends and patterns and to raise challenging issues to do with the impact of technology on society.

Bartholomew (2000) reflects: "PalmPilots. Windows CE. Car phones. Cell phones. Armband computers for warehouse management. Bar-code readers. Pagers. Geophysical positioning devices. Where will it all end?" His compelling question "where will it all end?" is noticeably rhetorical. Science holds to the unalterable creed that there is 'no end.' To Bartholomew's list we could add: RFID transponder implants. Cochlear implants. Brain implants. Soul chips… the list can go on and on, bound only by the limits of the imagination and time. About the Verichip RFID, fourteen year old implant recipient Derek Jacobs commented: "I think it's one more step in the evolution of man and technology… There are endless possibilities for this" (Scheeres, 2002). Kurzweil believes that we are now entering that explosive part of the technological evolution curve. Kurzweil's *Law of Accelerating Returns* states that "[t]he evolution of biological life and the evolution of technology have both followed the same pattern: they take a long time to get going, but advances build on one another and progress erupts at an increasingly furious pace." Fixmer (1998) described

this plight as humanity's attempt to accelerate its own evolution and Mann calls it a *new kind of paradigm shift* that society has not yet experienced.

CONCLUSION

The idea of the Electrophorus is one that no longer exists in the realm of the impossible. This being the case, the requirement for inclusive dialogue is now, not after widespread diffusion. There are many lessons to be learnt from history, especially from such radical developments as the atomic bomb and the resulting arms race. Joy (2000) has raised serious fears about continuing unfettered research into "spiritual machines". Will humans have the foresight to say "no" or "stop" to new innovations that could potentially be a means to a socially destructive scenario. Or will they continue to make the same mistakes? Implants that may prolong life expectancy by hundreds if not thousands of years might sound ideal but they could well create unforeseen devastation in the form of technological viruses, plagues, a different level of crime and violence.

To many scientists of the positivist tradition solely anchored to an empirical world view, the notion of whether something is "right" or "wrong" is redundant and in a way irrelevant. To these individuals a moral stance has little or nothing to do with technological advancement but more with an ideological position. A group of these scientists are driven by an attitude of "let's see how far we can go", not "is what we are doing the best thing for humanity"; and certainly not with the thought of "what are the long-term implications of what we are doing here." One need only consider the maddening race to clone the first animal; though many have long suspected an 'underground' scientific race to clone the first human. Today many observers believe

that engineers and professionals more broadly, lack accountability for the tangible and intangible costs of their actions (O'Connell 1988, p. 288). The dominant belief is that *science* should not be stopped because it will always make things better. The reality is however, that even seemingly small *advancements* into the realm of the Electrophorus if 'unchecked', for anything other than medical prosthesis, will have dire consequences for humanity. "Once man has given technique its entry into society, there can be no curbing of its gathering influence, no possible way of forcing it to relinquish its power. Man can only witness and serve as the ironic beneficiary-victim of its power" (Kuhns, 1971, p. 94).

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KEY TERMS AND DEFINITIONS

Bionic (Wo)man: Combining both biological and electronic elements in a man or woman that allow prosthetic limbs to be controlled by on-board computers.

Cybernetics: is the study of nervous system controls in the brain as a basis for developing communications and controls in socio-technical systems.

Cyborg: the concept of a man-machine combination- a human who adds to or enhances their abilities by using technology.

Law of Accelerating Returns: As order exponentially increases the time between salient events grows shorter, i.e. advancements speed up and the returns accelerate at a nonlinear rate.

Electrophorus: a human *bearer* of electricity. The root *electro* comes from the Greek word meaning “amber,” and *phorus* means to “wear, to put on, to get into”. When an Electrophorus passes through an electromagnetic zone, he/she is detected and data can be passed from an implanted microchip (or in the future directly from the brain) to a computer device.

Homo Electricus: the new species of man that the *Electrophorus* would belong on the evolutionary ladder in the continued speciation of humans.

Humanoid Robot: A robot that looks like a human in appearance and is autonomous. The term was derived by Czech playright Karel Capek in 1920 from the Slav word for *worker*.

Human Evolution: is the part of the theory of evolution by which human beings emerged as a distinct species.

Microchip implants: are integrated circuit devices encased in radio-frequency identification transponders that can be active or passive and are implantable into animals or humans usually in the subcutaneous layer of the skin.

Transhumanism: abbreviated as >H or H+ is an international cultural movement that consists of intellectuals who look at ways to extend life through the application of emerging sciences and technologies.