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Warning: Cybotopia Ahead

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A cybotopia would be a world in which cyborgs and AI machines and systems dominate and rule over "unenhanced" humans, turning human beings as we know them today into a sub-species, or lower-order being.

A dystopia, transliterated from Greek roots of this word, is a "not good place". It's a society which is profoundly dysfunctional by the standards of human civilization.

When mathematical genius John von Neumann wrote his prescient final work *The Computer and the Brain* in 1956, he laid the theoretical framework for one day connecting the neural system of the brain directly to the digital networks of computers. He described how the brain and the computer are powerful computing machines, or automata, which share many characteristics and processes. The analogies he saw between the brain and computer opened up the possibility of one day forging a deeper working relationship between them.

Forty six years later, on the 14th March, 2002, at the Radcliffe Infirmary in Oxford, von Neumann's futuristic vision of a connection between computers and the brain became reality when Kevin Warwick, professor of cybernetics at the University of Reading, UK, received an implanted microelectrode array which was connected to the median nerve just below the wrist of his left arm. The electrode array, securely attached to his nervous system, was later linked up via wiring to a connector pad strapped to his arm. This pad contained an interface with a built-in radio transmitter/receiver. A cable then linked this implanted system and connecting device to a computer monitoring system.

This was the day the world's first cyborg was born. Information technology had been incorporated into a human being. Computer processes could be linked directly to human neural processes. The computer and the brain were about to work together as von Neumann, just before he died, had imagined might be possible.

Following the implant, various ground-breaking experiments were subsequently carried out. In one of them, Warwick travelled to New York where he was able to move an articulated hand linked to a computer and located in his lab in Reading, about 3,500 miles away, by sending neural signals from his left hand into a computer, via the connecting pad on his arm, and then over internet to the robotic hand in the lab.

Warwick had succeeded in integrating globally connected information technology into his own body.

The Information Age that opened up and took hold in the second half of the previous century is, in this way, likely to be followed by a Cybernetic Age characterised by increasing connections between the human nervous system and the globally connected computer.

A cyborg-dominated world could arrive within a generation from its inception in 2002, namely by about 2030.

It took more or less one generation for information technologies to become absolutely dominant in society.[1] Microsoft was founded in 1975 and Tim Berners-Lee invented the World Wide Web in 1989-1990, with the first web servers outside CERN being switched on in January 1991. Soon after that, internet reached critical mass. This was followed by a wave of mass adoption of the technology by both businesses and households. The dot-com bubble occurred in the years 1997–2000 and had already burst by 2001. So, there was exactly one generation between the emergence of Bill Gates on the world stage and the "dot.bomb" of 2000-2001.

Will the cyborg technologies envisaged by von Neumann and pioneered in practice by Warwick become dominant and mainstream within a generation, that is, by 2030?

The big difference, of course, is that a laptop and a tablet are devices located outside the human body, whereas implants require surgical interventions. The invasive nature of implants – and the twin risks of rejection and infection - will be a major inhibitor slowing down mass adoption. Another inhibitor will be ethics, for many people, myself included, will harbour a number of philosophical, religious or moral questions about the emergence of a new cyborg class. A third inhibitor will be politics. I see no way in which transhumanists promoting a cybotopia can sidestep the issue that the path heading towards a Singularity will divide humanity permanently into AI-enabled beings and bio-humans, dislocating human civilisation with the most radical technology ever invented, ending 6,000 years of cyclical social history. A cybotopia would take the phenomenon of creative destruction to whole new levels, causing conflict on a scale that would readily escalate into a continuous world war between these two types of competing creatures. Cyborg technologies in the hands of the bad guys - sociopaths, organised criminals and fascists - would be nasty, brutish and devastating. But even the good cyborgs like Kevin Warwick would be helpless to prevent the depersonalisation of society into a high-surveillance technocracy in which human individuality and privacy would vanish forever. Nor would he have the power to prevent the spread of a new kind of megalomania, a cyborg power complex which, allied to deep-seated human competitiveness, would be an extremely disturbing outcome.

[1] "The Information Age formed by capitalizing on the computer microminiaturization advances, with a transition spanning from the advent of the personal computer in the late 1970s, to the Internet's reaching a critical mass in the early 1990s, and the adoption of such technology by the public in the two decades after 1990." http://en.wikipedia.org/wiki/Information_Age

That said, cyborg technologies will certainly become standard practice in the medical profession and usher in amazing cures for mental and physical disabilities and diseases in the next two decades. A golden age for the disabled may be just around the corner. This not just good news – it is glorious news. In that sense alone, I salute the bravery of Warwick's historic self-experiment in becoming a cyborg.

But the human race should not thus be fooled by these medical breakthroughs into adopting cyborg technologies for non-medical, enhancement purposes. Nor should we ever consider abandoning philosophical and scientific responsibilities in some runaway technological Singularity.

There's a line in the sand if we are to maintain the principles of human civilisation as the Information Age makes way for the Cybernetic Age. It is this: the scientist creates and controls the science and its application in technology for the greater good of humanity. It is not the science and its application in technology which should control the scientist or dominate humanity.

But that is precisely the topsy-turvy world of the Singularity and of a transhumanist cybotopia.

The dangers in the very idea of a cybotopia are fourfold:

- Abandonment of human and scientific control to the impersonal forces of technology
- A deep polarisation of humanity into cyborgs, driven by megalomania, and bio-humans
- A loss of human individuality in technocratic depersonalisation along with our traditions of social justice which have evolved over centuries and are squarely based on the dignity and uniqueness of individuals
- A rupture of evolution and of the ancient synergy between humanity and Mother Nature, the source of all life

These are four risks too many. John von Neumann's mathematical human brain is, in the end, a reductionist picture, one which overlooks the dimensions of imagination, intuition, emotion and conscience which, together with rationality, have been responsible for creating human society.