Human Potential, the Information Society, and Cyborgization

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Abstract:
One of the most important aspects of our information society is the ever increasing complexity of human-machine communication and integration. This new intimacy between humans and machines has led to various types of cyborgization -- the creation of human-machine systems. These systems reflect both qualitative and quantitative changes in human-machine relations, especially with information technologies. The implications of this growing "cyborg society" for human potential are tremendous. On the technical level proliferating cyborg technosciences are playing a major role in restoring humans to their previous abilities (as with medical interventions) as well as extending and enhancing human abilities (especially with military and industrial applications of cyborg technosciences). The creation through genetically engineered participatory evolution of posthumans is also a very real possibility.

Just as significant are the ways cyborgization changes political and social conceptualizations. The crisis of postmodern war and the creation of infowar, the devolution of the nation state into international/regional and non-governmental forms, and the reorganization of the world economy are all directly related to the fundamental ways the information society is reconfiguring human potential and, indeed, humanity itself. To understand and shape these changes we need to think in terms of a cyborg body politic that gives as much weight to our informational and industrial infrastructures as the body politic values embodied and cultural realities. And, in order to preserve not just our human rights, but our very agency, we need to work toward an understanding of cyborg citizenship and what it entails. --

Introduction

To fully appreciate what the information society means for human potential one has to put it into context. "Information society" is a rather general term encompassing the whole range of ways information handling technologies are fundamentally transforming society. Many analysts even argue that this impact is so great we can think of our current times as marking a great transition from an industrial economy to an informational one, just as hunter-gatherer economies became agricultural which then matured into industrial. But we can be more specific, especially when we try to understand the political ramifications of our informational society and it's possible effect on human potential. I have argued in my work that our informational society is, more specifically, becoming a cyborg society, as our relationship to our tools, which many people argue differentiates us from animals, has gone from tool invention through machine construction to the present stage of intimate human-machine integration: cyborg society.

In this paper I will attempt to convince the skeptical that cyborgization is of central importance, that is has incredible implications for human (and post-human) potential,

and that it has specific ramifications for thinking about politics on global and regional levels. Particularly, using the metaphor of the cyborg body politic, we can begin to understand how the information-cyborg society will act differently in terms of industrial and political organization in terms of such new phenomena as virtual corporations and nations without states. But first, we must explore the cyborg idea.

The Importance of the Cyborg Idea
The term cyborg is new but the idea is not. The dream of creatures combining artificial and natural aspects can be found as far back as the classical Greek and Indian civilizations. But it wasn't until a 1960 NASA conference on modifying the human for living in space that cyborg was coined by Manfred Clynes. Clynes, a world class pianist with a knack for inventing computers, melded cybernetic and organism into "cyborg" to enliven the ideas of his paper, coauthored with Nathan Kline, the famous psychiatrist and expert on psychotropic drugs. Clynes and Kline suggested that humans could be modified with implants and drugs so that they could exist in space without spacesuits. It is not as crazy as it sounds, but even Clynes would admit today that you'd need genetic modifications as well to make such a transition possible. In fact Clynes, who continues to work on cyborg ideas with his theory of sentics, (the physiological basis of emotions) and with a number of startling computer-music programs, now feels that humans will pass through at least four different cyborg stages, with genetic modifications being the last. The term cyborg did catch on, but not among scientists and engineers who prefer more specific labels such as biotelemetry, human augmentation, human-machine systems, human-machine interfaces, teleoperators, and to describe copying natural systems to create artificial ones, bionic. However, cyborg took off among science fiction writers who had already recognized the incredible integration of technology into natural systems that was starting to transform society. I initially resisted the argument that the figure of the cyborg was crucial for understanding contemporary society. Although Donna Haraway's essay "Cyborg Manifesto" had encouraged me to apply to the doctoral program where she teaches, I wasn't struck by the cyborg idea (very familiar to me as a science fiction reader and writer) as much as I was inspired by her refusal of either an adulation or a outright rejection of technoscience. She argued that... ...taking responsibility for the social relations of science and technology means refusing an anti-science metaphysics, a demonology of technology, and so means embracing the skillful task of reconstructing the boundaries of daily life, in partial connection with others, in communication with all of our parts.

It was only when the cyborg continually reappeared during my graduate research on the role of computers as weapons and metaphors in military policy that I began to realize that Donna was right about the cyborg, perhaps even more right then she realized herself. The twentieth century human body can be conceived of through any number of rich and insightful metaphors. In important ways it is a disciplined body, a textualized body, a gendered body, and a resisting body. But more and more it seems to me that one of the most fruitful metaphors is to conceptualize the human body as a rhetorical and material construction of the discourses and cultures of technoscience, the mass media, and the military; a creature that combines informatics, mechanics, and organics: a cyborg.

Many humans are now literally cyborgs. Their inorganic subsystems can range from complex prosthetic limbs to the programming of the immune system that we call vaccinations. In the industrial and so-called post-industrial countries a "cyborg society" has developed where the intimate interconnections and codependencies between organic and machinic systems are so complex and pervasive that whether or not any particular individual in that society is a cyborg, we are all living a cyborgian existence.

But haven't people and societies always been cyborgian in some sense? In a word, no. Certainly we can look back into the human past and note how crucial the human-tool and human-machine relationships have been, but quantitatively and qualitatively the cyborg relationship is new. Today there is the integration of the human and the tool; there is the symbiosis of the human and the machine. Yes, the cyborgian relationship is a direct development of these earlier human-tool and human-machine pairings, but we have now entered a fundamentally new stage, perhaps even a culmination, of this history. Cyborg is as specific, as general, as powerful and as useless a term as tool or machine. And it is just as important. Cyborgs are proliferating throughout contemporary culture, and as they do they are redefining many of the most basic concepts of human existence.

The Proliferation of Cyborgs
Cyborgs are being created in numerous places in our culture. Some of these cyborgs are imaginary, some are quite real. Others seem to be both. A good place to begin a cyborg tour today is where my own research started, the military.

Lewis Mumford argued that the very first machine was an army, with the soldiers and their weapons making up the moving parts. This early proto-machine looks suspiciously like a cyborg, as does the 20th Century "megamachine" that Mumford railed against. Considering the special status of weapons, the disciplining of individual soldiers into cleanly working parts, and the crucial role militarization has played in the fostering of industrialization and automation it is clear that war has been a major force in the drive to integrate humans and machines into effective complex systems. The culmination of this process was World War II with the genesis of computers and the elaboration of incredibly complicated human-machine systems: ships, fleets, planes, wings, weapon teams, armies. Since then human-machine weapons systems have become the norm.

One of my specific interests has been examining how cyborg technology is restructuring gender roles in the contemporary military, creating a series of masculine and feminized roles that have more to do with rank and mission (especially in terms of combat) than sexual characteristics. The same could be said for exploration in space and the deep sea. There is no function for sex or gender in these settings. The humans are part of a system, with specific roles. Their moments of autonomy are sharply prescribed by ground control, their mission, their space ship, and by space itself.

The folks at NASA are fond of saying that space is just another place to work. Well, that's an exaggeration. Outer space (and aquaspace) are particularly unforgiving environments where you must be a cyborg, and very careful, to survive. But there is some truth in the jest, for most corporate leaders would also argue that you must integrate workers and machines into complex computerized systems effectively if you

are going to last long in capitalist-space. My own experiences as a consultant for Hewlett-Packard were an eye opener. When I first went into the cavernous office space of their Corvallis, Oregon inkjet printer factory it seemed that the ubiquitous computers were the main focus, with the humans flitting about like bees bringing them honey in the form of data. In my two years working there I saw first hand how crucial effective human-machine communication is in the hyper-competitive world of high tech industry, where H-P excels. It's not that the human is neglected. H-P treats its workers very well indeed. But they also treat their computers well and they pay special attention to how well humans and computers get along.

Industry has led the way in modifying other creatures to be cyborgs, whether it is roaches to explore pipes, mice for genetic research or cloned mammals for the mass production of meat, wool, even human hormones and organs. And industry has done incredible things in with modelling (the latest Boeing aircraft was never a physical prototype) and in tracking workers. So while in most areas of cyborg research governments are ahead business is rapidly catching up, urged on by the unforgiving, very visible, whip hand of competition.

Cyborgs have directly paid off in one industry already: entertainment. Mass media, from action figures to movies, is full of cyborgs. A day spent watching children's television will turn up dozens. Talking dinosaurs with implants, mutant turtles, detectives with pop-up heads, and scores of space warriors are among the many varied cartoon cyborgs. Robocop, the Terminators, Luke, Darth, and CP30 of Star Wars, and the many cyborgs of Star Trek have been among the most influential cyborgs of the movies. But if you watch the mass media much you'll find you can't escape cyborgs and their issues in any genre. Lawyer and doctor TV shows are full of cyborg plots around transplants, definitions of death, and other real technoscientific issues. Even sports shows and events lavish attention on elaborate equipment, sculptured (with machine workouts) bodies, and complex reconstructive surgery. Documentary channels and news shows plot the cyborgization of war and industry and the spread of the internet and on the X-Files and the SF channel the wilder speculations about cyborgs are explored in chilling detail.

Yet some of the most startling uses of the cyborg come from the art world. Numerous paintings and multimedia displays are on cyborg themes, but it is in performance art, where the artists cyborg themselves, that the limits are being pushed furthest. Stelarc, an Australian, has gone from piercings and hanging himself to the use of elaborate prosthetics as he explores the limits of his flesh, as measured against his desire to be a cyborg. Orlan, a French artist, has undergone a series of cosmetic surgeries, documenting every detail. She has tuned one of the most common cyborg interventions into a performance that raises profound questions about the role of fashion in cyborg medicine. Which is fitting, for medicine is where some of the more startling implications of cyborgization are just becoming clear. For example, advances in medical cyborg research are redefining the line between humans and animals through xenoplants. All transplants involve cyborg medicine, since the organ, the recipient, and the whole process are managed through systematic literal and conceptual mechanization. Already pig tissue is used successfully for a number of transplants such as cartilage and corneas. Unsuccessful liver xenoplants from baboons have been making the headlines for a number of years and soon, judging by the successes in

controlling immune responses, they will be successful. An artificial liver invented in Japan is a cyborg machine in itself since it requires two dogs as an integral part of the apparatus. Liver functions are so complicated we haven't been able to totally simulate them.

Human transplants, and the use of artificial organs and body parts, continues to increase. Modifying ourselves through medicine is becoming more and more common. Now literally millions of interventions are performed to suck out fat or put it in, carve better facial features, modify the immune system, or otherwise "improve" the natural body. But perhaps the most significant area of medical cyborg intervention is in the last years or days of life, when many people are kept alive because they are linked to complex machines. Not only has this become the major cost center in our very expensive medical system but it is also completely changing the meaning of death and life. Working doctors and medical technologists no longer speak of death plain and simple. Patients are "single-dead," "double-dead,," or "triple-dead," depending on what machines they are hooked to, what their heart and brain are doing, and whether or not their organs can be harvested. The ability of cyborg medicine to prolong life has been balanced by the systematic prolongation of death for many people, leading to a movement for a right to die.

The rights of the living dead are negotiated in the courts, the legislatures and the hospitals, from the cold precise work of the "procurement specialists" who harvest transplant organs from neomort humans and sacrificial animals to that Johnny Appleseed of Death, Dr. Kevorkian, who has assisted in the suicides of over thirty terminally ill people. Dead mothers birth live children and dearly departed dads father fresh babies. More and more patients live on as brain-dead bodies or in the senile dementia of high tech prolonged dying. Both longevity and euthanasia increase as do political struggles around death. As one newspaper headline put it: "Deciding when you want to die becomes a part of American life." Today the very definition of life and death is a difficult, inexorable, and intimate cyborgian issue. And so is reproduction as the new book Cyborg Babies makes clear. Complex medical interventions have been developed to treat infertility that involve extracting human eggs and fertilizing them in "washed" sperm before reimplantation. Lately scientists have even found a way to do away with the sperm altogether through cloning techniques. So we have the possibility of a 65 year old woman giving birth to her genetic twin. Or, actually, with a few modifications, a 65 year old man could give birth to his genetic twin.

So it turns out that the definition of sex is also an issue of cyborg technology. Of course, transsexual surgery and hormonal therapy can reconfigure a person from male to female, or the other way around. But even on a more subtle level cyborg thinking has exploded our old two-sex/gender system. As infomedicine has replaced biomedicine the body is now conceived of a set of data, including hormone levels and exposures, bodily sexual characteristics, sexual attractions, and genetic markers. Scientists are now arguing that there are actually three, five, even eleven sexes depending on what criteria one chooses. Gender identification it turns out is even more plastic than sex, as any visit to cyberspace will show. Cyberspace is actually a new place and a cyborg place. When you go there you leave your body behind. The

importance, economically and therefore politically, of cyberspace needs no elaboration here. But the general issue of the politics of cyborgs does demand discussion.

Cyborg Politics
The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centers structuring any possibility of historical transformation. –

Donna Haraway
    Public policy is being profoundly impacted by cyborgian technologies in ways the current debates about the information highway, genetic research, high tech military interventions, and doctor-assisted suicides merely hint at. Without a broad, historically rich and philosophically deep understanding of the interrelationship of these issues -- in the concept of the cyborg and of cyborg society -- these discussions will be impoverished, and, inevitably, ineffectual. Consider the debates on infowar that dominate much contemporary military thinking. Unless the insights of information theory are incorporated into this new military field we can be sure there will be disasters because one of the few things information theory is clear about is its own limits. Conscious political responses to the increasing cyborgization of the human range from the joyous or accepting to the horrified. Unconscious reactions seem to cover the same spectrum as can be seen in cyborg portrayals in the mass media where countless "bad" cyborgs and "good" cyborgs are featured in various cartoons, films and TV shows. Often the same story will have both. But not always. While many subcultures obsessed with cyborg transitions are individualistic or even libertarian (in the U.S. pro-capitalist sense), like the Extropian techno-optimists, there are certainly some that are authoritarian, such as Aum, the Japanese cult. Subgroups who see themselves as human-machines have a long history, especially in war. The right-wing World War I German veterans who formed the Freikorps, the shock troops of Fascism, explicitly embraced a self-conception of body self-loathing and killing machine worship. Ernst Jünger, their leading poet, rhapsodized about the imaginary man whose "instinctual energies have been smoothly and frictionlessly transformed into functions of his steel body." While today's military explicitly ignores this transformation of instinct into technologized body, in popular culture it is the latest thing, in the form of tattoos, brands, piercings and ornamental prosthetics. Not that such modifications are apolitical. In the piercing, tattooing, and other body modification subcultures there are certainly extreme right-wing tendencies but most such enthusiasts see their art as a glorification of the body instead of a loathing of it as exemplified in the Freikorps early in the century and the Christian Right of today. Politically, cyborgification refuses simple mappings. While cyborg technoscience may offer states, and other institutions (businesses, religions) tremendous new powers it also offers citizens a chance to communicate among ourselves and become empowered in other ways. The thing is to take it seriously, as Donna Haraway argues:

There are several consequences to taking seriously the imagery of cyborgs as other than our enemies. Our bodies, ourselves; bodies are maps of power and identity. Cyborgs are no exceptions. A cyborg body is not innocent; it was not born in a garden; it does not seek unitary identity and so generate antagonistic dualisms without end (or until the world ends); it takes irony for granted. One is too few, and two is only one possibility. Intense pleasure in skill, machine skill, ceases to be a sin, but an

aspect of embodiment. The machine is not an it to be animated, worshiped and dominated. The machine is us, our processes, an aspect of our embodiment. We can be responsible for machines; they do not dominate or threaten us. We are responsible for boundaries. We are they.

So, inevitably as it represents one of the crucial borders in political culture, citizenship is being reconfigured by the cyborg technosciences and by the direct challenges to the very idea of the human, which are coming from genetic, medical, computer, and military technologies. If citizenship is worth preserving it must by cyborged, with a full understanding of all the relevant technical, philosophical, historical, and political implications and with an effort to update them, as with my Cyborg Bill of Rights proposed in an article in the journal Cultural Values and elaborated on in my forthcoming book Cyborg Citizen.

Steven Mentor and I have explored some of these ramifications in our work on the cyborg body politic. To understand current political institutions one has to accept that they are cyborgian entities, made up of human bodies, cultures, and technologies in complex and intimate linkages. Global interdependence, the rise of nations and the decline of states, the proliferating forms of corporate relationships and economic processes (such as e-business) can only be understood in the context of cyborg society and the cyborg body politic. Scholars are beginning to use this analytic to examine real world political problems. Good examples are the collections Prosthetic Territories and Cyborg Worlds, the discussions of post-colonialism and political resistance by Joseba Gabilondo, Chela Sandoval, and William Macauley with Angel J. Gordo-Lopez published in The Cyborg Handbook, and Diane Nelson's brilliant use of the prosthesis metaphor to explain contemporary Guatemalan politics in her new book A Finger in the Wound.   There is even more unpublished work, such as Joseba Gabilondo's argument, from a Basque perspective, for nations without states and Francisco La Rubia-Prado's analysis of transitions in Spanish politics in the framework of Franco and Francoism as cyborgian.   A number of new collections are being put together to continue this type of cyborg body politic analysis.

Human and Post-Human Potential
Other academics have begun trying to put these changes into perspective without using the image of the cyborg. For example, the historian David Channel sees our current culture as a merging of the longstanding Western ideals of organic order ("The Great Chain of Being") and artificial rationality ("The Clockwork Universe"). He argues that today these two trends come together in the idea of the vital machine. Bruce Mazlish tells a slightly different story, an epic about the human quest to gradually transcend our illusions. It starts with the rejection of the pretense that we are at the center of the cosmos (the Copernican Revolution), then the illusion that we are fundamentally distinct from animals died (overthrown by evolutionary theory), followed by our realization that we are not even completely rational (thanks to Freud and the unconscious). Finally, the "Fourth Discontinuity," as he calls it in a book of the same name, will have to go. It is the artificial divide we've drawn between humans and machines.

Inevitably people began to see the earth itself as a cyborg system. As Donna Haraway put it referring to the Gaia theory that the biosphere is a self-regulating system, Gaia is

a "cyborg world." Considering the domination of humans and our technologies in the biosphere this seems inarguable. Gregory Stock, a physicist and science writer, has given this insight a masculinist twist in his book Metaman. He postulates that the earth is one cyborg creature with its own needs and desires, including the procreation of other metamen throughout the galaxy. As cartoonish as it sounds, when you combine the dynamics of the Gaia theory with Stock's impressive documentation it almost becomes a convincing story. Something has happened. Whatever you call it, the living system we are part of is clearly both organic and machinic. And it is evolving.

In their 1960 article Clynes and Kline went on after describing the cyborg idea to discuss its implications, the foremost being participatory evolution. Clearly, if humans are modifying ourselves to live in space and other strange places, the dynamics of natural evolution have been supplanted, at least temporarily, by artificial evolution. And artificial evolution isn't just the conscious breeding of farm animals that Darwin discussed, it now includes the direct modification of human bodies and genes. Our interventions are now crude, but the new technosciences that are making the nanotechnology revolution a reality, including in particular genetic engineering, promise that very soon, in terms of natural evolution, we will be creating creatures that can't even be classified as humans.

The probability of post-human cyborgs is one that horrifies some people, and thrills others. N. Katherine Hayles has one of the best discussions of "posthumanism" in her book We Have Always Been Posthuman. While stressing that human and humanism and posthuman and posthumanism are in part cultural constructions, she doesn't neglect the technologies driving much of our thinking, and feeling, about this transformation of humanity. The posthuman (which will be cyborgian) offers both dangers and opportunities for our future. But these simple dichotomies are not adequate. Scholars, such as Chela Sandoval and Joseba Gabilondo have focused on how cyborgs make race and nationality profoundly ambiguous. If identity is plastic on the physiological level, it is certainly so in culture. They argue there is a liberatory potential in the cyborg borderlands and shifting identities; in the confusion over the line between human and machine. The second problem with simple "good" vs. "bad" cyborg dichotomies is that they may not be the most important ones to focus on. Steven Mentor, Heidi Figueroa-Sarriera and I commented on this in our essay "Cyborgology" in the introduction to The Cyborg Handbook:

There are, after all, more important distinctions to make, between just and unjust, between sustaining and destroying, between stable and erratic, between pleasure and pain, between knowledge and ignorance, between effective and ineffectual, between beauty and ugliness.

We go on to elaborate on this.

All of these are dangerous dualities, to be sure, but spectrums we have to face in any event, even if only implicitly or by omission. Once, most people thought that artificial-natural, human-machine, organic and constructed, were dualities just as central to living, but the figure of the cyborg has revealed that it isn't so. And perhaps this will cast some light on the general permanence and importance of these dualities. After all the cyborg lives only through the symbiosis of ostensible opposites always in tension.

We end with a call that our readers consider going beyond dualistic epistemologies and consider the epistemology of cyborgs:

THESIS, ANTITHESIS, SYNTHESIS, PROSTHESIS, and again.

Reality is not a simple swinging to and fro, nor is it a straightforward march to completion. We are not determined by our technology. We do not construct the world socially.   Our technologies, our cultures, our will, and nature all dance together weaving a future from the present. Reality is dynamic, and lumpy. Some things follow from others, some persevere, others seem to just appear. But that is because we can't comprehend everything that is going on. We can understand a great deal. but not everything and any epistemology that pretends we can know it all is seriously flawed. And we've got to get on with figuring out what is happening to us, because for good or ill (probably for both) the era of posthuman possibilities is beginning. To deny it is dangerous. To recognize it is to begin to understand, perhaps even control, our future.

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