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Introduction

Uncanny, yet familiar

We are all familiar with images of robots, cyborgs, replicants, clones, and chimeras as well as superhumanly intelligent, vast computer networks. Science fiction literature and movies are richly populated by such figures and creatures. Ever since Mary Shelly's *Frankenstein* the creation of such fictional figures has always served the purpose of questioning some aspects of our interpersonal lives, our attitudes, values and aspirations or most fundamentally, the human condition itself and the paths we may be taking. Most science fiction testifies to a thoroughly naturalized understanding of the world where scientific progress has enabled the almost unbounded manipulation of biological processes, the mechanization of intelligence and the seamless integration of the organic with the synthetic, an exchange between the biological and digital worlds. On the other hand, science fiction also probes the limits of this naturalization and a common theme is precisely the demonstration of some residual, yet essential element of humanness that resists technologization.

This thesis is to a great extent about a contemporary intellectual movement called *transhumanism* that holds that the science fiction of yesterday is about to become science proper and embraces an utterly naturalized understanding of human existence. The name 'trans-humanism' indicates that the human in its current form is viewed as a transitory being, whose purpose it is to overcome its limitations. The movements' central tenet is that we should use our growing technological prowess to far surpass current biological constraints and engineer ourselves towards a state of increased ability, intelligence, sophistication and longevity. Although this prospect is greatly reminiscent of familiar scenarios from the world of science fiction, the notion that it may soon become our everyday reality strikes most people as improbable, strange, alienating or uncanny. Nevertheless, transhumanist ideas have become widely discussed and bioethical debates in particular can not avoid thinking earnestly about the possibility of radically modifying humans. The term *Human Enhancement Technologies (HET)* has become the rubric under which questions of our imminent technological self-manipulation are mainly dealt with.

Convergence Towards Enhancement

Humanity has always used culture-specific methods and practices to increase the capacities and extend the limits of human biology. These methods can range from the use of substances like caffeine or gingko, through the creation and application of increasingly complex tools, up to systematic ways of disciplining and educating the mind and the body. In a certain sense the entire process of cultural development can be understood as a series of attempts to overcome *natural* human limitations. However, in our present age the never ending quest to better the human condition seems to have reached a crucial turning point. The convergence of the fields of **N**anotechnology, **B**iotechnology, **I**nformation technology and **C**ognitive Science seems to enable previously unimaginable degrees of intervention into matter, into life processes and into human nature. Convergence denotes the increasing cooperation, methodological exchange and general union of the mentioned four scientific disciplines. Its proponents depict the convergence of sciences and technologies as a much needed unification of knowledge-seeking endeavours after many years of disciplinary separation. Following a programmatic document published by the U.S. National Science Foundation in 2002 the approach has also been dubbed NBIC.[1] It has a rather clearly defined orientation towards enhancement, which is evidenced by the following statement: "At this moment in the evolution of technical achievement, *improvement of human performance through integration of technologies* becomes possible."

Also, recent biomedical advances are blurring the lines between therapeutic and enhancing interventions on the human body. The best illustration of this process is perhaps the controversial case of Oscar Pistorius, the "fastest man on no legs". The double-amputee athlete with prosthetic legs, Pistorius wanted to compete in the 2008 Beijing Olympics but the IAAF initially ruled him ineligible because an independent study concluded "that cheetah prosthetics offer clear mechanical advantages"[2] over healthy individuals. This ruling was later reversed and Pistorius could have entered the games had he managed to run the required qualifying time, which he failed by 0.7 seconds. His case demonstrates how hard it is to untangle dis-ability from super-ability in the age of advanced prosthetics.

It is thus gradually becoming possible to use biotechnological means not just to cure diseases or ameliorate suffering but also to improve upon normal, healthy functioning. Some have even

[1] Rocco M. C., Bainbridge W.S., (eds.), 'Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science' NSF/DOC-sponsored report, 2002. URL: http://www.wtec.org/ConvergingTechnologies/1/NBIC_report.pdf Last retrieved: 21 August 2010

[2] Oscar Pistorius - Independent Scientific study concludes that cheetah prosthetics offer clear mechanical advantages, Website of the International Association of Athletics Federations, 14 January 2008 http://www.iaaf.org/news/kind=101/newsid=42896.html Last retrieved 20 August 2010

suggested that we are at the threshold of a new biomedical paradigm that involves a transition from *restitutio ad integrum* to *transformatio ad optimum* as the chief medical concern.[3] Given the facts that universal health insurance is not a global phenomenon yet and that millions of people die each year of easily preventable diseases this claim might sound grotesquely preposterous. Nevertheless the trend towards and "enhancement medicine" are starting to take shape in developed Western countries. Furthermore, a number of enhancements in the future are likely to be spin-offs or "side effects" of mainstream biomedical research, as the case of Pistorius demonstrates.

Projected breakthroughs in genetics, nanotechnology, stem cell therapy, human-computer interfaces and psychopharmacology are currently the subjects of great hope and hype but have also provoked significant anxieties and strong resistance. Because the impact of these developments is potentially profound, the turn of the 21st century has seen the emergence of heated philosophical,[4] ethical,[5] legal[6] and other discussions concerning the appropriate use of these technologies.

Does 'human nature' possess some form of binding normativity that would preclude technological modifications aimed at improvement?[7] Are we victims of a morally questionable 'drive to mastery' that needs to be overcome?[8] Would human enhancement lead to a new form of eugenics, the breeding of superior people and thus fundamentally upset the social and political order?[9] Or, to the contrary, is it perhaps the case that we may need to think about enhancements as somehow levelling out the distribution of capacities; could enhancements serve the purpose of more, rather than less equality and fairness?[10] Might we even have a moral obligation to enhance?[11]

In the year 2000, four leading U.S. bioethicists published a book under the title *From Chance to Choice – Genetics and Justice*, in which they analyzed the challenges posed by recent biotechnological developments to ethical reasoning and distributive justice.[12] The four words, *from chance to choice* perfectly express and bring to the point a crucial issue that lies at the heart of current technoscientific developments. One might only want to add a question mark at the end. While new possibilities seem to expand the domain of human agency and choice to fundamental

[3] See Wiesing, U., The History of Medical Enhancement: From Restitutio ad Integrum to Transformatio ad Optimum?, in Medical Enhancement and Posthumanity, Springer Netherlands, 2009. pp. 25-37.
[4] Bailley, H. W., Casey, T., K., Is Human Nature Obsolete? – Genetics, Bioengineering and the Future of the Human Condition, MIT Press, Cambridge, MA. 2005.
[5] The President's Council on Bioethics, BeyondTtherapy – Biotechnology and the Pursuit of Happiness, URL: http://bioethics.georgetown.edu/pcbe/reports/beyondtherapy/beyond_therapy_final_webcorrected.pdf Last retrieved 20 August 2010
[6] Wienke, A., Eberbach, W., H., Kramer, H.J., Janke, K., (eds.) Die Verbesserung des Menschen – Tatsächliche und rechtliche Aspekte der wunscherfüllenden Medizin, Springer, Heidelberg, 2009.
[7] Habermas, J., (2003) The Future of Human Nature. Polity Press, Cambridge
[8] Sandel, M., The Case against Perfection: Ethics in the Age of Genetic Engineering. Harvard University Press, 2007.
[9] Fukuyama, F., Our Posthuman Future: Consequences of the Biotechnology Revolution. Picador, New York, 2002.
[10] Buchanan, A., Brock, D., Daniels, N., Wikler, D., From Chance to Choice – Genetics and Justice. Cambridge University Press, Cambridge, 2000.
[11] Harris J., Enhancing Evolution, 2007. Princeton University Press.
[12] Buchanan, et al. op cit.

biological levels, they may also be seen as means for inscribing power relations and the status quo of social expectations and ideals ever deeper in the body.

There is thus a broad spectrum of opinions concerning the desirability and the limitations of new technologies. Whereas some consider them to be nothing more than new and more sophisticated means for treating and preventing disease, for others, these developments hold out the promise of exchanging the chance of the *natural lottery* for free human choice, thus liberating us from the burdens of our biological determination. Enthusiastic voices speak of radically enhanced humans, indefinitely expanded life spans and the creation of superhuman artificial intelligence. The position of those eagerly embracing these prospects could be called *progressive technoeuphoric*, while *conservative technophobia* is characterized by the fear that our technological *hubris* might make us lose the essence of what it means to be human.

Transhumanist thinkers are perhaps the most ardent supporters of enhancement technologies. They argue that emerging technologies and future artificial intelligence will allow us to greatly extend the human lifespan and to radically alter, or even transcend the human condition altogether, possibly ushering in a post-biological era.[13] In their view, this emancipation from the confines and injustice of the natural lottery would result in the emergence of the 'posthuman' – a being that is vastly superior to humans and exhibits total control over its own physical, intellectual and emotional capacities. Interestingly, the literal merger of man and technology, and ultimately the replacement of humans by posthumans are considered to manifest the true unfolding and fulfilment of human potentials, as if the purpose of being human had always been self-transcendence. A consideration of different varieties of posthumanism will be a significant part of this thesis.

Because contemporary bioethical debates revolve around the forms of legitimate intervention into life processes they unavoidably include making judgments about the value of certain forms and ways of life, and ultimately about what it means to be human, or to live a meaningful life. These dilemmas and meditations over what man can, may and should make of himself are the most contemporary struggles with the question Kant considered to be the ultimate matter of philosophy: "What is man?"

Thesis Structure / Thesis Outline

The present work addresses the question of enhancement technologies in three steps. The first chapter will give a brief overview of the history of ideas pertaining to efforts at making better people. This historical reconstruction will also identify major philosophical currents and intellectual antecedents of transhumanist thought.

[13] Kurzweil, R., The Singularity is Near. Penguin Books, New York, 2005.

The second chapter Drawing on literature from both the philosophy of technology and science and technology studies I try to outline a critique of the foundational assumptions this debate rests upon. The heart of the critique is that both ardent opponents of enhancement and enthusiastic supporters embrace an idea about the relationship between human nature and technology that is largely untenable. Whereas some argue in favour of a strict separation of human nature from a perceived impure technological impingement others jubilate the arrival of „liberation biology".[14] Yet, both positions seem to relate to technology as if it were something external and look at its application to humans either with fear or joyous expectation. Instead of this clear separation I argue with Haraway, Hayles and others that technology shapes, mediates and intimately permeates our lives; in an especially succinct formulation „what we make and what (we think) we are co-evolve together".[15] Our relation to technologies is thus not evident and univocal but highly ambiguous and ambivalent. Emerging technologies shall likely neither strip us of our 'humanness' nor makes us absolute masters of our destiny but entangle us in ever complexer relations.

The final chapter then attempts to sketch some features of this ambivalence using mainly genetic technologies as examples. The three aspects I am going to discuss concern on the one hand the undoubtedly liberating potential of these technologies as biology becomes more open to intervention and choice. Yet, simultaneously there are at least two tendencies that provide reason to be cautious. First, there is a lot that suggests that the augmentation of human characteristics as well as the possible creation of species-untypical traits may become subsumed under the logic of perpetual performance enhancement driven by competition and consumerism. Second, the advancement of sophisticated diagnostic and monitoring tools increasingly gives rise to screening, preventive and pre-emptive measures. This suggests that the enhanced human body will be a thoroughly monitored, surveilled and highly normalized body. The aspired unfolding of human potentials may thus harbour far more stratification and control than enthusiasts recognize.

Hence, the thesis starts from a description of visions of human perfectibility, proceeds through an analysis of the contemporary debates about posthumanism and ends with a consideration of current biopolitical trends that may give us an idea about likely developments in the future.

[14] Bailey, R., Liberation Biology: The Scientific and Moral Case for the Biotech Revolution, 2005., Prometheus Books, New York

[15] Hayles, K. N.,'Unfinished Work: From Cyborg to Cognisphere', *Theory, Culture & Society*, vol. 23, July, 2006. p. 164.

- Chapter 1 -

How Human Enhancement Came To Be

Chapter Outline

In this chapter I will sketch the history of ideas pertaining to human enhancement understood in a rather broad sense. It shall provide an overview of different attempts at improving humans, achieving perfection and longevity. It will recount the story of Western philosophy's intimate relationship with efforts aimed at improving humans. It is also a fascinating story of great ambivalence that depicts humans simultaneously as utterly deficient creatures who are condemned to a life of misery, pain and a meagre existence flowing from their very nature, yet who are also capable of endlessly changing, manipulating and perfecting everything around them, including themselves. As almost all historical reconstructions my attempt certainly makes no claim to being exhaustive. It shall rather outline the transformation of the idea of manipulating and improving humanity by different means as described in a variety of genres ranging from utopian fiction through political campaigns up to our present day debates where Human Enhancement Technologies have become a mainstream topic within bioethical discourse, they feature prominently in popular culture and often make it to the news headlines. In a certain sense, this chapter makes an attempt at tracing the genealogy and intellectual antecedents of current techno-optimistic positions, such as transhumanism.

Forever Young – Myths and Alchemy

Mortality, the fleeting and ephemeral nature of human existence has prompted cultures of all times and places to reflect upon the possibility of lengthening life. It is certainly impossible to recount here all the different conceptions and attitudes towards death as the spectrum of opinions is extremely broad. It ranges from the view that earthly life itself is merely transitory, with death signalling the entry into an infinitely more important eternal afterlife, through the notion that with the death of the body life ceases altogether, to the view that by the application of proper methods – magical, scientific or spiritual – human life and vitality can be indefinitely extended. Death can be seen as an unavoidable fact of human existence that is to be met with dignity or as the unacceptable limitation of human endeavours, which must be conquered or at least contested.

Man's quest for longevity and immortality has featured prominently in a number of myths and mystical traditions such as the well known ancient Greek parable of Tithonus whose tragic fate

was sealed when Zeus granted him eternal life but not eternal youth. The Epic of Gilgamesh is among the oldest written records of human history and a significant portion of this Mesopotamian poem describes the pursuits of the heroic demigod king Gilgamesh as he attempts to attain immortality by gaining hold of a special plant that grows at the bottom of the sea and possesses the magical power of rejuvenation. After many misadventures Gilgamesh manages to gather the plant but in the end it is snatched away from him by a serpent leaving him mortal like all other men.[16] According to the epic, this is the reason why snakes have attained the ability to shed their skins and live long lives. The story may be read either as an expression of man's deeply rooted longing for eternal youth or as an allegory of the futility and misplaced nature of such attempts.

In a long chapter of his seminal work *A History of Ideas about the Prolongation of Life* Gerald Gruman has collected stories, myths, and religious and philosophical theories that in one way or another testify to the impossibility, undesirability or outright immoral nature of attempting to overcome mortality. Gruman subsumed these accounts under the heading „apologism" for they all seek to somehow render acceptable the facts of ageing, decline and death. After a detailed description of relevant theories Gruman summarizes the grounds on which the prolongation of life has been opposed. He uses the term *prolongevity,* which is defined as „the significant extension of the length of life by human action" and lists the following 6 types of arguments against it:[17]

- Prolongevity is ruled out by inherent defects in human nature.
- Prolongevity is a violation of the natural order
- Prolongevity violates the divine order
- Prolongevity is ruled out by original sin
- Prolongevity is of itself undesirable
- Old age and death are desirable

Remarkable about this set of arguments is that it has remained fairly constant over millennia albeit there have also been some more recent additions to the list of counterarguments. Even though average life expectancy has witnessed tremendous change the argument that adding deliberately to the number of life years is problematic still seems convincing to many. Arguments directed against life extension still make recourse to the naturalness and desirability of death and old age as evident and unchanging features of life.[18]

As opposed to apologist myths and thinkers like Aristotle, Marcus Aurelius or Thomas Aquinas who rejected prolongevity Gruman devotes most of his attention to what he calls „meliorist" theories. This approach does note take illness, ageing, decline and death as natural and

[16] Gruman, G., J., A History of Ideas about the Prolongation of Life, Springer Publishing Company, 2003.
[17] Ibid. p. 26-27
[18] Kass, L, Life, Liberty and the Defense of Dignity, 2004. Encounter Books

unalterable givens but attempts to overcome them. The contemporary transhumanist movement stands clearly in this meliorist line of thought that can look back at a long history even though it would certainly be mistaken to lump together undifferentiated all the meliorist efforts.

At about the same time when Aristotle and Epicurus were active in the West Taoism began to burgeon in China. Compared to the Greek thinkers who had a clear apologist orientation in relation to prolongevity the philosophy/religion of Taoism was explicitly concerned with lengthening life. To this end it employed different mystical techniques, alchemist practices and a general philosophy of quietism, of preserving one's life-forces by acting effortlessly and in perfect harmony with nature. The prolongation of life and ultimately immortality were thus inherent parts of this tradition and seen as a sign of sagehood. In later centuries an institutionalized Taoist church even prescribed prolongevity practices to all of its members. Though Taoism went into decline following the 12th century it has played a crucial and lasting influence on Chinese culture and its naturalistic alchemist practices represent valuable proto-scientific undertakings that have also influenced the West through Arab transmission.[19] As Gruman notes, Taoism was the very first systematic attempt to attain longevity that was nevertheless greatly hindered by lack of organization and a form of primitivism that sought return to a past golden age.[20]

In the West the first figure to stress the desirability of prolonging life was 13th century philosopher and alchemist Roger Bacon who explicitly distanced himself from the merely health oriented attitude of Galenic medicine and sought more radical means.

Alchemists were the bearers of an arcane knowledge that with the works of Paracelsus later evolved into scientific chemistry. They sought to create an elixir of life or what has been called the Philosopher's Stone that was also capable of transmuting metals into gold. Alchemy was a highly secretive art and its followers were men and women who came from all walks of life and who adhered to different faiths, Moslems, Christians and Jews. It was a controversial activity to engage in alchemist practices as it was sometimes tolerated or even exploited by courts and kings and at other times pursued as a form of heresy.

One of the alchemists' methods of obtaining the purest substance of all was through distillation and the separation of the pure from the impure. This refinement or transmutation can take on many different meanings as it also refers to the production of a perfect thing than can bestow this perfection on everything else, thus also eliminating all forms of suffering.[21]

The theoretical foundation of alchemy was greatly influenced by Aristotelian natural philosophy. It was believed that the world consisted of four elements – earth, air, fire and water –

[19] Gruman, op. cit. p 80.
[20] Ibid.
[21] Moran, B., T., Distilling Knowledge – Alchemiy, Chemistry and the Scientific Revolution, Harvard University Press, 2005. p. 24.

which in turn were made up of 4 qualities: hot, cold, wet and dry. By manipulating the qualities it was possible to transmute elements and thus things themselves.[22] An explicitly Aristotelian influence was the idea expressed for example in the first sentence of the Nichomachean Ethics that all things aimed for perfection.[23] Within alchemy this natural striving for perfection was recognized in the way that elements too strived for their purest form even if left untouched. Alchemists thought to catalyze this otherwise very slow process of natural purification and then confer this perfection upon humans.

The most famous alchemists were Bacon, John of Rupescissa and Raymond Lull.[24] Bacon often referred to the theme of antediluvian people who lived for centuries. From this he concluded that the currently reduced lifespan must not be fixed and unalterable but due to improper hygiene, immorality and no knowledge of the secret art of life extension.[25] Bacon had no idealistic thoughts about growing old and falling into slow decline, however, because he was a devout Christian he did not believe that immortality was attainable for humans. He merely sought to return to what he considered to be the normal lifespan of humans, which he estimated to comprise many centuries of vitality.

Interestingly, Bacon was also a proponent of a form 'degeneration theory' that will be a central theme when I come to a discussion of eugenics. Bacon believed that bad habits and poor hygiene diminished one's health and that this acquired trait was heritable such that succeeding generations not only received bad habits but also a weakened constitution.[26]

There is a remarkable similarity between the things Taoists and alchemists held to be of life extending quality. Such things include "[…] pearls, coral, rosemary, aloe wood, the flesh of serpents, ambergris, gold, […]".[27]Based on reasoning by analogy they assumed that those things that themselves were long-lived or otherwise "perfect" had the power to lend this quality to other entities. Similarly, just as disease was known to be contagious, the mere vicinity of healthy and especially young virgin women was thought to rejuvenate and further health.[28]

Later, as the natural sciences began to burgeon and chemistry as a distinct approach attempted to solidify itself alchemy became discredited.[29] Figures closely associated with the rise of natural science also held that the prolongation of life was not only possible but also desirable. Francis Bacon thought for example that technological progress might enable mankind to regain their original purity both of thought and action that they possessed before the expulsion from the

[22] Ibid. p. 26.
[23] Aristotle, Nichomachean Ethics, Batoche Books, 1991., p. 3.
[24] Lull was also important forerunner of the idea of mechanizing thought in his *Ars Magna*.
[25] Gruman op. cit. p. 107.
[26] Ibid.
[27] Ibid. p. 110.
[28] Ibid. p. 111.
[29] Moran, B., op. Cit.

Garden of Eden.[30] Though this would not have meant immortality but certainly a considerably extended lifespan.

The Birth of Eugenics in Plato

Already at the dawn of the history of Western philosophy we find an elaborate depiction of a utopian society, which is ordered according to the highest principles of Justice and the Good. In the Republic Plato sums up his views on metaphysics, the nature of the soul, ethics and politics and describes an ideal form of social organization. The central question of the work concerns the issue of justice and how a perfectly just society can be erected. Plato considers the functioning of the ideal state to be inseparable from the proper functioning of the individuals who comprise it. An analogous relationship exists between the structure of the state and the constitution of its inhabitants. In Plato's organicist model, just at the soul is considered to consists of three parts – reasoned, spirited and appetitive – so too does the ideal state comprise three classes of citizens who are mainly defined by the dominance of either soul part. Justice prevails if each soul part and correspondingly each class can exhibit its specific virtue and fulfil its proper role at a destined place within the social fabric. Philosopher kings, who are endowed with wisdom are destined to rule for they have gained insight into the world of ideas and possess the requisite knowledge to guide the polis. They are supported by auxiliary guardians whose defining characteristic is courage and their dominant soul part is the spirited one. The lowest class of merchants and labourers are defined by the appetitive soul part whose destiny it is to obey rulers and guardians, yet the material foundation of society depends on their work. In order to ensure this strict and static social hierarchy the reproduction of the upper classes is carefully monitored and guided by the republic in order to ensure superior births.[31]

Thus Plato, drawing on metaphors of animal breeding has given a detailed account of a state-run eugenics programme many centuries before Galton had systematically developed the idea. His views on state-controlled reproduction have anticipated significant elements of all later eugenics programmes, including the rhetoric of fear from degeneration if reproduction remains unchecked and state intervention to further the bearers of the most desirable and hinder those with the least desirable traits to reproduce.[32]

By giving such a simplified and condensed account of Plato's infinitely more complex theory I wanted merely to highlight the peculiar fact that developing detailed accounts and arguments in favour of controlling reproduction according certain societal goals has been an

[30] Dusek, V., Philosophy of Technology, Blackwell Publishing, 2006.
[31] Häyry, M., he Historical Idea of a Better Race,Studies in Ethics, Law, and Technology, Volume 2, Issue 1, 2008. pp.
[32] See for example Plato, The Rebuplic, V 459a-459b.

imminent part of Western intellectual history ever since its inception. In a somewhat acrimonious paraphrase of Whitehead's famous sentence, one might even say that the Western „tradition" of eugenics consists of a series of footnotes to Plato.

Humanism and Perfectibility

Giovanni Pico Della Mirandola's 1486 *Oration on the Dignity Of Men* serves as a central historical reference. Mirandola can be credited for formulating the idea that human beings are ultimately shapeable, without any assigned and ultimate nature.

> We have given you, Oh Adam, no visage proper to yourself, nor any endowment properly your own, in order that whatever place, whatever form, whatever gifts you may, with premeditation, select, these same you may have and possess through your own judgment and decision. The nature of all other creatures is defined and restricted within laws which We have laid down; you, by contrast, impeded by no such restrictions, may, by your own free will, to whose custody We have assigned you, trace for yourself the lineaments of your own nature . . . We have made you a creature neither of heaven nor of earth, neither mortal nor immortal, in order that you may, as the free and proud shaper of your own being, fashion yourself in the form you may prefer.[33]

In light of this, man appears as a creature characterized essentially by its freedom to mould itself into whatever form it wishes. However, humans seem to be torn between the world of low beasts on the one hand – which can be equated with instincts, with the body, or with biology – and the world of divine intellect on the other hand. Being human means existing at the interface of these overwhelming forces. As implicated by Mirandola the truly worthy path for humans to pursue is the one, which surpasses brutish forms of life. This understanding of man's nature as unfixed and shapeable is one of the major sources of contemporary techno-optimism coupled with the belief that our "brutish", animal-like life needs to be transcended. This side of our existence is increasingly equated with biological constraints in general.

About 100 years after Mirandola natural sciences began to burgeon and make some progress into the realization of this vision. The sciences had given rise to the idea that it was possible to study, understand and influence nature. This has signalled an important transition from the formerly highly influential Aristotelian notion that man's *techne* merely imitated nature. The new idea considered nature to be something uncharted and unknown that now lies ready to be studied and manipulated according to man's desires.[34] Francis Bacon, who is often credited with being the father of modern natural science and the developer of the inductive method of reasoning held that science held great values for society and in his utopia *The New Atlantis* he depicted a community of

[33] Mirandola, P., d., Oration on the Dignity of Man, Gateway, Chicago, 1957, p. 7.
[34] Wiesing, U., Zur Geschichte der Verbesserung des Menschen, Zeitschrift für medizinische Ethik, 52/4. 2006. pp. 323-338.

scientists that closely resembles modern research universities. His ideas have greatly contributed to the foundation of the Royal Society.

Another figure closely associated with early science who considered perfectibility an imminent possibility was Descartes. He was quite explicit on the issue establishing a link between the prolongation of life, improving faculties and medicine in effect conceptualizing life extension as the postponement of death, which is exactly the way current technoprogressives think of the issue.

> […] it would be possible to be free of innumerable illnesses of both body and mind, and perhaps even the decline of old age, if we knew enough about their causes and the remedies with which nature has provided us. […] For even the mind depends so much on the temperament and disposition of the organs of the body that, if it is possible to find some way of making men in most cases wiser and more skilful than they have been hitherto I believe that it is in medicine that it must be sought.[35]

A particularly controversial figure was the physician Julien Offray de La Mettrie who is most well known for his book L'homme machine from 1748. His utterly consistent mechanistic materialism has earned him two exiles and an eternal fame in the history of philosophy. He took a more radical view than Descartes in reducing even the mind to workings of matter and suggesting that man himself was a machine. He had done away with all the previous metaphysical assumptions that rationalists had relied upon to guarantee truth and morality and La Mettrie embraced a complete physicalism.[36] It would be gross exaggeration to say that such views were generally held at the time, which is evidenced by the fact that La Mettrie got banished from two countries for his views. Rather, it signals the gradual transition towards a naturalized understanding of human nature that also gradually transformed notions of an immaterial soul into an equally mysterious but in principle understandable mind.[37]

Thus gradually the proper utilization of man's intellect was perceived to be the only prerequisite for achieving a harmonious society and subduing nature. Faith in the improvability of the human body was perhaps most emphatically voiced by the Marquis de Condorcet, who regarded the scope of perfectibility to be infinite.[38]

Transhumanism considers itself to be an extension of this tradition, and commitment to Enlightenment values has been repeatedly expressed by a number of authors.[39]

Eugenic Perfection and the Rise of the Future

[35] Descartes, R., A Discourse on Method, Oxford University Press, 2006. p. 51.
[36] Dupre, L., Enlightenment and the Intellectual Foundations of Modern Culture, Yale University Press, 2004.
[37] Martin, R., Barresi, J., Naturalization of the Soul, Routledge, 2000.
[38] See U Wiesing, 'The History of Medical Enhancement: From Restitutio ad Integrum to Transformatio ad Optimum?', in *Medical Enhancement and Posthumanity*, Springer Netherlands, 2009. pp. 25-37.
[39] See N Bostrom, 'The Transhumanist FAQ', Humanity Plus, Last Update: October 2003. viewed on 1 January 2009, <http://transhumanism.org/index.php/WTA/faq/> or J Hughes, Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future' Institute for Ethics and Emerging Technologies, viewed on 1 January 2009, <http://ieet.org/archive/20070326-Hughes-ASU-H+Religion.pdf>

The birth of the theory of evolution in the 19th century provided enormous impetus to the project of naturalization and served as an enormous assault on the self-understanding of man. Evolution degraded the status of man to that of a mere descendant of the animal kingdom whose nature had been shaped by a long series of chance events. Besides destabilizing previous understandings the theory of evolution also provided a new way of looking at the future of mankind. It opened the possibility of consciously guiding the course of development.

In 1883 Francis Galton, a cousin of Charles Darwin coined the word *eugenics*, meaning „noble in heredity".[40] The science of eugenics, which was meant to improve the human stock by selectively breeding the suitable and preventing the same to the less fit, spread quickly around the world, with institutes being established in Europe, Russia, Australia and the United States. Galton proposed that eugenics allowed mankind to take control of its own evolution.[41] Eugenicists in the early 20th century were mainly concerned about the gradual degeneration and impoverishment of the human gene pool. The concept of degeneration has a multifaceted origin. On the one hand Bénédict-Auguste Morel a French psychiatrist of the mid-19th century and an enthusiastic supporter of the first form of biological psychiatry launched the concept on its fateful trajectory. At the time the belief was that major mental illnesses not only had a strong genetic component, meaning that they ran in families, but also that the illnesses progressively got worse as they were passed on.[42] Thus 19th century worries of the degeneration of the populace loomed high. Degenerates – who were often identified with the morally condemned homosexuals, onanists and premature ejaculators[43] - were seen as the losers and deficient figures in the evolutionary battle for survival. Yet, their procreation was considered a social problem.

> Degeneracy is more than an individual disease, it is a social menace: It is important to combat it with a rigorous form of social hygiene. One must not forget that the degenerate is often a dangerous individual against whom society should and must reserve the right to protect itself.[44]

Even though the notion of mental illness progressively getting worse with succession of generations had become largely discredited within psychiatry by the time of the end of the First World War, as Shorter says, "the genie was out of the bottle" and the concept unfolded its sinister effects elsewhere. In fact, degeneracy was not just an issue of psychiatry. This burgeoning field was merely a prominent site were the issue came up, but degeneracy was perceived as the key to all social problems including poverty, criminality, etc. Socio-biology advocated by such figures as Herbert

[40] See Kevles, D., J., From Eugenics to Genetic Manipulation, in Science in the Twentieth Century, Krige, J., Pestre, D., Harwood Academic Publishers, Amsterdam, 1997 pp. 301-317.
[41] See Kevles op. cit.
[42] Shorter, E., A History of Psychiatry, John Wiley & Sons, 1997. p. 93
[43] Ibid.
[44] Magnan quoted in Ibid. p. 96

Spencer held that "Under the natural order of things society is constantly excreting its unhealthy, imbecile, slow, vacillating, faithless members".[45] It was therefore necessary not to hinder this natural process of purification. Interestingly, nature is elevated to a standard for society on this account. Eugenics went a step further and advocated that certain measures be taken to halt degeneration on the one hand, and improve the stock on the other. However, for such authors as Galton positive eugenics was far more superior and important than negative. "The possibility of improving the race of a nation depends on the power of increasing the productivity of the best stock. This is far more important than that of repressing the productivity of the worst."[46]

Eugenics had reached its highpoint during the era of National Socialism in Germany, which simultaneously represents the deepest abyss mankind has ever descended to. It was a time when the promotion of the breeding of certain „races" and the extermination of others was elevated to the central concern of politics. As we shall see later in this chapter eugenics did not fade after the World War II. A number of authors propagated it and the practice continued in the form of compulsory sterilizations up until the 3rd quarter of the 20th century in a number of developed and democratic countries.[47]

In a certain sense the rise of the eugenics movement, but already before that the notion of degeneration had signalled an important transformation. As Laure Cartron observes – drawing on Foucault – during the 18th and 19th centuries the relevance of genealogy had been supplanted by that of heredity. With this change a new dimension seemed to have entered life, and began to be contemplated, namely that of the *future*. Parallel to this the *child* as such emerged as an important concern which bore the seeds of the coming society.[48] The emergence of the future as an issue is also suggested by the fact that the first time-utopia was also published in 1771. Mercer's work is the first in the genre of utopian literature that does not locate the utopian society at a distinct place but in the writer's own future thereby adding new dynamism to the concept.[49] Also, Michel Foucault said of Kant's short piece "What is Enlightenment?" to be the first philosophical work calling for a reflection on the present. [50]Who are we in the present? Kant's answer to the question concerning the Enlightenment is also one directed at the future, namely it is an „exit" leading us out of our immaturity.

[45] Herber Spencer quoted in Rafter, N., H., Creating Born Criminals, University of Illinois Press, 1997. p. 37.
[46] Galton, quoted in Paul, D., B., Genetic Engineering and Eugenics: The Uses of History, in: Is Human Nature Obsolelte? P. 127.
[47] Kevles, D., In the Name of Eugenics, University of California Press, 1985.
[48] Cartron, L., Degeneration and „Alienism" in Early Nineteenth-Century France, in Rheinberger, HJ., Müller-Wille, S., Heredity Produced: At the crossroads of biology, politics, and culture, 1500-1870, MIT Press, 2007. pp. 155-174.
[49] Koselleck, R., Begriffsgeschichten, Suhrkamp Verlag, 2006.
[50] Foucault, M., What is Enlightenment? In, Rabinow, P., (ed.) The Foucault Reader, Pantheon Books, New York, 1984. pp. 32-51.

Before I continue with the discussion of utopian projects aimed at improving mankind I want to briefly turn to Kant's philosophy of history and some of the tensions inherent to it. I believe it is of great relevance for the present topic.

Philosophy of History – From Kant to Cosmism

An elemental tension that permeates the philosophy of Immanuel Kant is that between human freedom and the purposiveness of nature. From this tension emerges the question concerning the purposive progression of history. Kant attempts to reconcile the postulate of human freedom with the idea of the necessary development of all natural capacities to their natural end. The question is whether and how it were possible to find a natural purpose in this fabric of history that is „in the large woven together from folly, childish vanity, even from childish malice and destructiveness."[51] In light of this natural purpose it might be possible to find some plan behind „this idiotic course of things human."[52] Were we not to make this assumption, so Kant, then we would have to rectify ourselves with the thought that the otherwise so obvious „majesty and wisdom of Creation" would make the history of man, which contained the purpose of the whole a „contemptible plaything."[53] Besides the problem of the freedom of man and the purposiveness of nature, which Kant attempts to reconcile with each other he is also at pains to rescue a certain conception of man's exceptional position in the grand scheme of things. This position is greatly challenged by the seeming meaninglessness of history. Kant supposes that within nature everything is destined to reach the fullest development of its end. In the case of man this development concerns reason. Thus the postulated natural purpose would imply that the history of man by necessity lead to the full development of reason. This will manifest itself in the establishment of a perfect civic constitution, the rule of law and a society of world citizenship that is ordered according to the principles of reason. However, as Kant notes in the second thesis of his *Idea for a Universal History from a Cosmopolitan Point of View*, "In man (as the only rational creature on earth) those natural capacities which are directed to the use of his reason are to be fully developed only in the race, not in the individual."[54] This means that the end – in the sense of purpose – of mankind can only be the result of a long and laborious process of bringing forth that capacity that resides in our species. Kant then goes on to add in the third thesis that

> Nature has willed that man should, by himself, produce everything that goes beyond the mechanical ordering of his animal existence, and that he should partake of no other happiness or perfection than that which he himself, independently of instinct, has created by his own

[51] Kant, I., Idea for a Universal History with a Cosmpolitan Purpose, in Kant, Political Writings (Cambridge Text sin the History of Political Thought), Cambridge University Press, pp. 41-54.
[52] Ibid.
[53] Ibid.
[54] Ibid.

reason.[55]

Kant has adopted the notion of the state of nature from the French Enlightenment. For the Prussian thinker the concept does not denote any historical period but rather a certain methodological starting point for further reflection. Natural man possesses no social attributes. She is neither free nor unfree, neither moral nor immoral. In a certain sense, natural man for Kant is like an animal, with one crucial difference however. Man is a transitory being – in a sense a bridge as Nietzsche will say later. Man bears the potential of development within himself. As Kant says man is like a crooked timber that needs to be straightened through the process of civilizing and cultivating.

Developing a detailed analysis of Kant's concept of nature would certainly exceed the scope of this thesis. I merely want to point to certain ambivalence. On the one hand it is nature that "has willed" the development of human capacities. This development constitutes the already mentioned plan of nature according to which every capacity must by necessity reach its natural end. However, on the other hand nature in the form of brutish, instinctive, *natural* existence must be overcome and surpassed.

The above quoted passage thus points to a fundamental dichotomy that became quite constitutive of the self-conception of man in the West. Namely the opposition between the world of nature and the world of free human affairs and reason. By defining man as *animal rationabile* Kant has defined the essence of being human as something processual and stressed the dialectical tension spanned between nature and being human. Man is the animal that can become rational. In this sense being human consists in the fulfilment of the task of overcoming our internal instinctual part and unfolding reason.

These two claims, the second and the third thesis lead to a grave problem of the Kantian philosophy of history that, as we shall see also played role in biopolitical utopias later to come. The problem concerns the massive injustice implicated by the fact that only the human race but not the individual can achieve the fullest development of its potentials. According to Kant

> It remains strange that the earlier generations appear to carry through their toilsome labour only for the sake of the later, to prepare for them a foundation on which the later generations could erect the higher edifice which was Nature's goal, and yet that only the latest of the generations should have the good fortune to inhabit the building on which a long line of their ancestors had (unintentionally) labored without being permitted to partake of the fortune they had prepared.[56]

Yet, we must find a way to cope with this injustice, otherwise it would remain impossible to stick to the assumption that "a class of rational beings each of whom dies while the species is immortal, should develop their capacities to perfection."[57] In order to illustrate the unfolding of the natural

[55] Ibid.
[56] Ibid.
[57] Ibid.

plan inherent to history Kant reverts to a rather interesting example.

> marriages, births, and deaths, they seem to be subject to no rule by which the number of them could be reckoned in advance. Yet the annual tables of them in the major countries prove that they occur according to laws as stable as [those of] the unstable weather, which we likewise cannot determine in advance, but which, in the large, maintain the growth of plants the flow of rivers, and other natural events in an unbroken uniform course.[58]

This example is far from accidental, because it was precisely during Kant's lifetime that political arithmetic and the search for laws and regularities in big collected databases began to blossom. One of the leading statisticians of the time with whom Kant also corresponded was Johann Peter Süssmilch. He believed that in his main work *The Divine order in the changes in the human sex from birth, death and reproduction of the same* he had demonstrated that the purpose of the divine creator could have been none other than that of making man, who was endowed with reason the ruler of the entire Earth.[59] He set out to show that the divine order was manifest in the arithmetic description of the way human demographics changed over time. However, he also believed the ruler of the state to be the earthly resident of the divine order and as such had to intervene in processes of reproduction.

According to Dorothy Porter Süssmilch represented an important figure in the transition from what Foucault called sovereign power to biopower and to the gradual taking hold of the biological life of the population by the state.[60] It is interesting to see some connections between this development and Kant's idea that the fullest maturation of capacities is only possible in the species and more importantly that this development was connected to the establishment of a certain form of state.

So while Kant supposed that history had a necessary progression he also thought that by recognizing the end towards which it progressed it was possible to contribute to it. In a certain sense, history became something that man could and should partake in and "do".[61]

This notion of history as something 'doable' by man in some sense is present in a number of thinkers from Rousseau through Kant. However, the notion reached its culmination in the philosophy of Karl Marx. For Marx the focus of inquiry shifted and it was no longer of prime importance to provide a *philosophical* reading of the history of man as was the case by Kant and Hegel. The world had to be changed and not merely interpreted.[62] Marx presented his theories with a strong claim to being scientific however he rejected a fully naturalistic understanding of man. For him history so far had consisted of class struggles between the ruling and the oppressed classes.

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[58] Ibid.
[59] Süßmilch, J. P. Die göttliche Ordnung in den Veränderungen des menschlichen Geschlechts aus der Geburt, dem Tode und der Fortpflanzung desselben, 1762. quoted in: Schmidt, D., Statistik und Staatlichkeit, VS Verlag, 2005. P. 59.
[60] Porter, D., Health, Civilization and the State, Routledge, 1999. p. 49.
[61] Kant, op. Cit.
[62] Marx-Engels Werke, Band 3, Seite 533 ff. Dietz Verlag Berlin, 1969

Should class struggle cease with the oppressed proletariat gaining hold of the means of production we would find ourselves in a different era.[63] This shift in the course of history was later interpreted by Engels as the final exit of man from animality.[64] It would signal the beginning of an epoch where the environment that has hitherto determined mankind would come under his conscious control. As Engels wrote:

> The conditions for life, which had previously dominated him, would then be placed under his dominion; and only then would man become consciously and in fact the lord of nature: he would become master of his own social organization.

Positivism, unbounded faith in progress and social and industrial turmoil of the time but such claims can also be understood as a radicalized form of emancipatory aspirations from nature that was present in early natural science and in Kantian philosophy as well. In the famous formulation of Engels the realization of socialism would mean nothing less than "the ascent of man from the kingdom of necessity to the kingdom of freedom"[65] It was precisely this ascent that groups of intellectuals in Russia before and during the time of revolution set out to achieve.

Russian Cosmism

The vision of final emancipation motivated the biopolitical utopias in the extraordinarily creative years shortly before and following the October Revolution. This was a period when a country devastated by civil war looked forward to a brighter future. The program of the revolution was nothing less than to create a new and higher breed of humans. In the pointed summary of Leon Trotsky

> […]man will set to work on himself, in the pestle and the retort of the chemist. For the first time mankind will regard itself as raw material, or at best as a physical and psychic semi-finished product. Socialism will mean a leap from the realm of necessity into the realm of freedom in this sense also, that the man of today, with all his contradictions and lack of harmony, will open the road for a new and happier race.[66]

The desired goal was to take the historical power of the proletariat that had finally been set free and submit it to systematic and scientific work and elaboration. Science, technology, education and state management were to join together and bring about the new man with hitherto unknown powers to transform the entire universe. These were among the demands of two utopist groups: God-Builders and Biocosmists. Among the members of such groups were highly influential scientists, poets and writers, such as Maxim Gorky who was one of the founding members of the group of god-builders, or Alexander Bogdanov whose theory of tectology greatly anticipated cybernetics and systems

[63] Ibid.
[64] Engels, F., The Development of Socialism from Utopia to Science, New York Labor News, 1892. p.34
[65] Engels, F., Socialism, Utopian and Scientific, New York Labor News Company, New York, 1901, p. 90.
[66] http://www.marxists.org/history/etol/newspape/fi/vol08/no07/trotsky2.htm

theory. Bogdanov was also working on rejuvenation technologies and life extension methods. He thought rejuvenation of the body was possible via blood transfusion from the younger to the older generations, which was also seen as an act of social cohesion that strengthened the collective body of society. He himself died during such a transfusion. In 1908 Bogdanov published a utopian novel that portrayed an idealised socialist state set on Mars.[67] The father of Russian space travel and rocket science, Konstantin Tsiolkovsky was also a devoted biocosmist whose scientific work was motivated by the desire to conquer space and create extraterrestrial colonies.

The group of biocosmists demanded the right to immortality and interplanetary freedom. What is more, Russian futurists envisaged a time in which the whole world, even the entire universe would be consciously transformed by the activities of mankind. The central demand of these futurists was the abrogation of death. They considered the unjust temporal limitations imposed on mankind to be unacceptable. The literal annihilation of all natural differences was considered to be the only path leading to a truly just society. It the words of Hagemeister

> There was a widespread expectation that science, art, and technology, freed from the ties of conflicting particular interests and for the first time functioning for the benefit of all humanity, would take an unprecedented upswing, pave the way for a "bright future," and transcend the final barrier blocking the gate to the realm of freedom - human limitations in space and time.[68]

Besides the obvious influence of Western thinkers these visions possessed genuinely Russian characteristics. A main source of inspiration was provided by a thinker called Nikolai Fedorov, the father of Russian Cosmism who was mostly neglected and of little influence in his lifetime. In his *Philosophy of the Common Task* Fedorov voiced the necessity of resurrecting all who have died and providing immortality to all the living.[69] Some of Fedorov's enthusiastic readers included Vladimir Solovyov, one of the greatest figures of Russian philosophy, and Fyodor Dostoyevsky. For Fedorov enabling the resurrection of all the dead as well as the conquest of space were the only possible solutions to the greatest evil imaginable, namely death.

> Despite Fedorov's invocation of science and technology and his emphasis on abolishing the distinction between the learned and the unlearned, his was a special science of the Gnostic type and there are definite parallels between his thought and the occult. Fedorov's "common task" was like an alchemical Great Work in which transmutation is achieved by science rather than the philosopher's stone. He advocated colonizing space to accommodate the increase in population when the dead were resurrected, harnessing solar energy, controlling the climate, and transforming nature by such means as irrigating Arabia with icebergs hauled from the Arctic. He predicted cloning and prosthetic organs (not organ transplants- the resurrected would need their organs).[70]

The fact that the revolutionary early Soviet intelligentsia set out to realize this grand project of

[67] See Bogdanov, A., Red Star: The First Bolshevik Utopia, Indiana University Press, Bloomington, 1984.
[68] Hagemeister, M., in The Occult in Russian and Soviet Culture p. 188.
[69] See Hagemeister, M., Unser Körper muss unser Werk sein, in: Groys, B., Hagemeister, M., (eds.), Die Neue Menschheit, Suhrkamp Verlag, Frankfurt am Main, 2005.
[70] Rosenthal, B., G., The Occult in Russian and Soviet Culture, Cornell University Press, 1997. p. 11.

immortalism can be viewed from a number of perspectives. On the one hand the devastation, the enormous backwardness of the country and the poverty and death caused by war and civil war demanded a higher form of justification than a mere economical one. The Marxist intelligentsia of the time thought purely in terms of economics, however, a mere economical explanation was simply not sufficient to justify the immense sacrifices and losses the people had endured. A fraction of the intelligentsia endorsed a higher form of justification, namely that of eternal life.[71]

On the other hand, Marxism was directly opposed to religion so the question of the possibility of redemption also presented itself anew. How was individual immortality to be guaranteed when its ontological basis had been dissolved? A practical answer was the technological creation of individual bodily immortality.[72]

Finally, the promise of immortality can be interpreted in light of the previously discussed tension that Kant had observed. Namely, that human capacities could only reach their natural end in the species but not in the individual. Russian utopists did not want accept this fact and looked for a solution. Since socialism had promised the arrival of an infinitely just society in was deemed necessary not only to guarantee immortality to every individual but also to resurrect all previous generations such that everyman can share in the benefits of the culmination of the historical process.[73]

Thus in essence, the finitude of life has been added to the list of problems that the state was expected to solve. At about the same time when Martin Heidegger contemplated the existence of man in terms of the inevitability of his being-unto-death, a few Russian thinkers demanded personal physical immortality as their fundamental human right. This represents the realization of a form of power that – in the words of Foucault – not only has the right to „'make' live and 'let' die"[74] but one that does not even permit death. Proponents of immortalism considered the complete state control of life, this total biopower to be the necessary precondition for transcending the limitations of humanity and achieving freedom. Full state control and the abolishment of death were seen as indispensable for the creation of a truly just communistic society.

The already mentioned Tsiolkovsky not only embraced immortalism but also espoused a radical program of eugenics and intended to do away with all forms of suffering in the entire universe. Preventing the reproduction of flawed beings was of crucial importance to him, be they unconscious animals, plants or humans deemed imperfect.[75] This was a rather peculiar thing at the

[71] Groys, B., Unsterbliche Körper, in: Groys, B., Hagemeister, M., (ed.), Die Neue Menschheit, Suhrkamp Verlag, Frankfurt am Main, 2005. p. 9.
[72] Ibid. P. 11.
[73] Ibid. P. 10.
[74] Foucault, M., Society Must Be Defended, Picador, New York, 2003. p. 241.
[75] Hagemeister, M., ‚Unser Körper muss unser Werk sein', in Groys, B., Hagemeister, M., (ed.), Die Neue Menschheit, Suhrkamp Verlag, Frankfurt am Main, 2005. p. 61.

time because the eugenics movement had only a very brief “blossoming” in Russia and even then such radical programs as Tsiolkovsky’s were rather not welcome. One of the reasons for this is that the strong reductionism and focus on hereditary factors that characterizes eugenics was incompatible with some Marxist theories. This stressed namely the constitutive force of social structures as opposed to biological determinants. Hence in Russia a Lamarckian version of the theory evolution gained foot and authors stressed the possibility of acquiring new traits during lifetime.[76] This may have contributed to the justification of “corrective labour camps.”

Clearly, these biopolitical utopias were embedded into a broad collectivist political vision. In 1921 Yevgeny Zamyatin’s dystopian novel *We* articulated a devastating critique of the burgeoning totalitarian communist regime.[77] Zamyatin depicted an utterly conformist society ruled according to scientific principles, where people are reduced to numbers and individuality is completely suppressed by the *One State.* Zamyatin’s novel has greatly influenced Geroge Orwell and probably Aldous Huxley as well.

Some thinkers in Russia even today argue that the philosophy of cosmism has the potential pave the way towards the next "divine stage of human development".[78]

British Biofuturism

In the 1920s’ England such prominent scientists and public figures as John D. Bernal, Julian Huxley and John B. S. Haldane have voiced visions that were in a certain sense less radical but otherwise very similar to the ideas of their Russian utopist contemporaries. British biofuturists have greatly influenced transhumanism and anticipated much of present day debates.[79] They propagated the scientific enhancement of the evolutionary process and put forth visions of a world where humans had over many millennia colonized the universe and radically re-engineered themselves.[80] They all embraced eugenics as a means of improving the human gene pool even after the Second World War, but held that it “must be free of racial and class bias.”[81] To different degrees they were all related to socialist, Marxist movements of their day and their visions had a tendency towards the kind of collectivist utopias characteristic of Russian futurists of the time.

Haldane has envisioned a future scenario where the crude methods of earlier eugenics had been supplanted by far superior technologies that allowed for the mass manufacture of perfected

[76] Grahan, L.,R., Science and Values: The Eugenics Movement in Germany and Russia in the 1920s, The American Historical Review, Vol. 82, No. 5 (Dec., 1977), pp. 1133-1164
[77] Zamyatin, J., We, Penguin Books, London, 1993.
[78] Hagemeister, M., Russian Cosmism int he 1920s and Today, in Rosenthal, B., G., The Occult in Russian and Soviet Culture, Cornell University Press, 1997.
[79] Hughes, J., Back to the Future, European Molecular Biology Organization reports, vol. 9. 2008. pp. 59-63.
[80] Ibid.
[81] Kevles op. cit. p. 310.

individuals, thereby effectively replacing motherhood. Haldane foresaw that some would be opposed to such applications but he adhered to a rather deterministic notion of technology and held that our values adapted to science and not vice-versa.[82]

Huxley, Haldane and Bernal articulated the prospect of the unification of mankind under a world government run according to scientific principles.[83] Such visions have largely motivated Aldous Huxley to write *Brave New World,* a dystopian novel that was meant to reveal the horrors of dehumanization brought about by a technocratic totalitarian state that used biotechnology to manufacture its citizens.[84]

Haldane and Herman Muller adhered to the usual type of argumentation that society was degenerating as a result of our growing medical successes in keeping the originally unfit healthy and procreating. They argued furthermore that our increasingly complex world requires us to move to higher levels of intelligence otherwise we will not be able to cope. This has become a central trope of techno-progressive argumentation that has been repeated often since the last century.

J. D. Bernal went even further in his visions and even articulated the idea of linking massively improved human minds together in a way that individual consciousness would

> vanish in a humanity that has become completely etherealized, losing the close-knit organism, becoming masses of atoms in space communicating by radiation, and ultimately perhaps resolving entirely into light.[85]

The Cyborg

The birth of cybernetics in the 1940s as a general theory of communication and control and the prospects opened by space travel in the 1960s provided a crucial image that became a central trope of transhumanism: the cybernetic organism, or *cyborg*. Cyberneticists Nathan Kline and Manfred Clynes coined to word *cyborg* in the 1960 article *Cyborgs and Space*, in which they also discussed the coming era of participant evolution.

The concept of the cyborg was originally meant to describe the technological supplementation of man for the purpose of space exploration. The first cyborg was a laboratory rat which Clynes and Kline fitted with an osmotic pump that could release chemicals into the animal based on its physiological signals. The original idea was that a cybernetic organism was probably

[82] Paul, D., B., Genetic Engineering and Eugenics: The Uses of History, in: Is Human Nature Obsolelte?
[83] Hughes, J., op. cit.
[84] Huxley, A., Brave New World, Perennial Classics, New York, 1998. Since its' publication Brave New World has often been cited as a depiction of the dangers of tampering with human nature. However, according to Nick Bostrom Brave New World can not be considered a critique of transhumanist aspirations because it does not portray human enhancement gone astray but rather the "tragedy of technology and social engineering being used to deliberately cripple moral and intellectual capacities." See N Bostrom, 'In Defense of Posthuman Dignity', Nick Bostrom's Home Page, http://www.nickbostrom.com/ethics/dignity.html Last retrieve 20 August 2010
[85] Bernal quoted in Paul, D., B., p. 133.

much more likely to function well in the inhospitable environment of outer space. It is much easier to change man to suit space than the other way around. According to Clynes and Kline the cybernetic expansion of man leaves him "free to explore, to create, to think, and to feel."[86] This liberation from the constraints of the body is to be achieved with the help of prosthetic extensions and supplements. Cybernetics contributed greatly to the conceptualization of man in terms of an information processing system. Hence, Clynes and Kline saw new technological possibilities in cybernetics that could be employed to free man from bodily constraints. As Katherine Hayles points out, despite the fact that cybernetics blurred the distinction between man and machine the underlying concept was to a great extent still defined by ideas of the Enlightenment and liberal humanism. "For Wiener, cybernetics was a means to extend liberal humanism, not subvert it. The point was less to show that man was a machine than to demonstrate that a machine could function like a man."[87] Obviously, for most cyberneticists it remained unnoticed that their conceptualizations actually framed the human in terms of a metaphor; the metaphor of the information processing system, which thus makes it essentially similar to a machine.

Later developments in cybernetics have shifted the focus of attention from feedback loops to the self-organization, or *autopoiesis*, of living systems. The theory of autopoiesis has had a great influence on biomedicine, resulting in the abandonment of the idea of exerting external control on the body in the form of prostheses and the like, that were characteristic of medicine in the post World War II era. This change in perspective has resulted in an increased concentration on system inherent influence and control procedures and is also related to the growing successes of molecular biology.[88]

Because cybernetics was basically concerned with the formal description of the behaviour of systems in terms of information communication, it proved to be very successful in serving as a language, bridging gaps between different sciences.[89] Information got conceptualized as an entity unbound by material substrates; as something that is in fact more fundamental than any kind of materiality. Information came to be viewed as the *essential form* underlying all phenomena. In the context of medicine this means that even the body itself loses its materiality to some extent, and becomes a carrier of extractable information.[90]

The cybernetic expansion of man as well as the concept of information have exerted a huge

[86] Clynes, M., E., Kline, N., S., Cyborgs and Space, in Gray, C., H., Mentor, S., Figueroa-Sarriera, H., J., The Cyborg Handbook, Routledge, London, 1995. p31

[87] Hayles, N., K., How We Became Posthuman, University of Chicago Press, 1999. p. 7

[88] Cornelius, B., Anatomien medizinischer Erkenntnis. Der Aktionsradius der Medizin zwischen Vermittlunkgskrise und Biopolitik; in Cornelius Borck: Anatomien medizinscher Erkenntnis. Medizin Mach Moleküle, Frankfurt, 1996.

[89] For example, the development of transplantation medicine, which required the collaboration of a number of disciplines, profited greatly from the theory of cybernetics. See Manzei, A., Körper – Technik – Grenzen, Kritische Anthropologie am Beispiel der Transplantationsmedizin, LIT Verlag, Münster, 2002.

[90] Manzei, A., Körper – Technik – Grenzen, Kritische Anthropologie am Beispiel der Transplantationsmedizin, LIT Verlag, Münster, 2002.

influence on visions of technologically enhancing humans that are faithfully depicted in familiar science fiction scenarios.

The Ciba Symposium

Despite the fact that following the Second World War the potentially sinister applications of eugenics and modern technology came to light many remained optimistic about the prospects of future development. At a famous symposium organized by the Ciba Foundation – now "Novartis Foundation – in 1963 Huxley, Haldane and a host of renowned scientists such as Francis Crick, a discoverer of DNA structure and Gregory Pincus the father of the Pill pondered over the issues raised by the growing possibilities of interference with 'natural processes'. Out of concern for the quality of the human gene pool a number of participants articulated the desirability of eugenic interventions.[91]

In a summary of the symposium's topics Julian Huxley speaks of the rise of a new philosophy that is informed by natural sciences and takes the transformation of the human species as its target. He christians this emerging philosophy "evolutionary humanism" implying that the old idea of man's self-driven transformation, emphatically voiced by Mirandola, is now combined with an evolutionary view. [92] Even in the 1960s Huxley echoed the old concern that humanity's genetic constitution is on the decline, so that

> Eugenics will eventually have to have recourse to methods like multiple insemination by preferred donors of high genetic quality […] Such a policy will not be easy to execute. However, I confidently look forward to a time when eugenic improvement will become one of the major aims of mankind.[93]

In fact, he considered the development of a global evolutionary policy to be of prime importance, so that all other policy domains would have to be derivative of it.

It was a time when fears about genetic degeneration due to radiation were widespread and certainly a time when Cold War paranoia was almost palpable. Expressing this quite frankly Lederberg a professor of genetics at Stanford noted:

> I think that most of us here believe that the present population of the world is not intelligent enough to keep itself from being blown up, and we would like to make some provision for the future so that it will have a slightly better chance of avoiding this particular contingency.[94]

Of course, such technocratic views were not entirely general at the symposium and some more sober voices raised the question as to the likelihood of decreasing such dangers by genetic interventions.

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[91] Wolstenholme, G., (ed), *Man and his Future*, A Ciba Foundation Volume, London, 1963.
[92] Huxley, J., The Future of Man – Evolutionary Aspects, in Wolstenholme, G., op. Cit. P. 5.
[93] Ibid. P. 16
[94] Lederbeg in Discussion in Wolstenholme op. Cit. P. 288.

It is rather interesting that the conference took place at about the time when effective contraceptive measures were first developed, so the topic of population control was also high on the agenda. Crick for example raised the controversial question whether people have the right to have children at all.[95] He held the view that it is not at all a private manner but something in which the state and community at large have a serious vested interest. He even proposed to

> […] encourage by financial means those people who are more socially desirable to have more children […] the way to do this is to tax children. […] it is unreasonable to take money as an exact measure of social desirability, but at least they are fairly positively correlated.

So the desirable man of the future is one with economic resources. He serves as the guarantor of the increase in the genetic quality of mankind.

The scientists of the gathering also recognized that their grandiose plans were probably difficult to carry through in an atmosphere of public outrage. So they set out to devise careful plans that could communicate and teach the populace about the importance of proper eugenic interventions. The volume published a few years after the conference is truly a fascinating read as it offers insight to bewildering technocratic visions. It is very much like eavesdropping on a discussion between Plato's man-breeders contemplating the ideal composition of citizens of the future. Remarkably, most members who championed eugenic and other interventions spoke *in the name of* humanity and representing a form of humanism. This was probably the last time that scientist took it on themselves to design an ideal path of progression, because soon after a new approach to human perfectibility and self-transformation emerged in the form of transhumanism.

Transhumanism Enters the Stage

The word 'transhumanism' was introduced by Julian Huxley, writing in 1957 that

> The human species can, if it wishes, transcend itself – not just sporadically [...] but in its entirety, as humanity. We need a name for this new belief. Perhaps transhumanism will serve: man remaining man, but transcending himself, by realizing new possibilities of and for his human nature.[96]

Whereas British biofuturists thought in terms of hundreds and thousands of years of evolution that still awaited mankind before it reached its full potential, second wave transhumanists such as Fereidoun M. Esfandiary – or FM-2030 – proclaimed that the transition from human to transhuman was already happening and could be further accelerated by actively supporting the advancement of science.[97] He wrote with unfaltering optimism and hope about a very near future in which humanity would be completely transformed.

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[95] Wolstenholme, G., (ed), *Man and his Future*, A Ciba Foundation Volume, London, 1963. p. 275.
[96] Huxley, J., New Bottles for New Wine, Chatto & Windus, London, 1957. p17
[97] See Klerkx, G., Transhumanists as Tribe, in Better Humans?, P Miller, J Wilsdon (eds.), Demos, London, 2006. pp. 59-66.

> We want to spread a daring new optimism crystallizing from the obvious fact that for the first time in all the eons of life we are no longer blackholed within this microplanet – no longer trapped within fragile terminal bodies – that we are emerging as a triumphant new species – extraterrestrial and immortal.[98]

I believe the continuity between such proclamations and those of earlier thinkers, especially the Russian Cosmists is striking. FM-2030's programmatic work contributed greatly to the launch of transhumanism as a movement. The book *Engines of Creation* published by Eric Drexler in 1986 also became a central work of reference.[99] Drexler described a potentially paradisiacal future in which the joint application of nanotechnology and advanced artificial intelligence would enable the creation of *universal assemblers* that could manufacture literally anything, thereby banishing the problem of scarcity and enabling fantastic forms of human enhancement via integration with our nervous system.

The central tenet of current day transhumanism is that the present form of humanity is but a transitory stage in the evolution of intelligence. With the advent of sophisticated technologies evolution by natural selection is being superseded by technological evolution driven by humans. There are a number of different views about the projected endpoint of this new evolutionary process. Ideas range from the colonization of space, through branching off into a number of superintelligent species to the idea that we will merge our consciousness with vast non-biological forms of intelligence thus moving beyond physical bodily existence altogether.[100]

In 1990 Max More and Tom Bell founded the Extropy Institute which had a strong libertarian orientation. The institute became defunct in 2006 after having accomplished its goal of raising awareness for transhumanist issues, developing a coherent philosophy and enabling networking between futurists. In 1998 Nick Bostrom and David Pearce founded the *World Transhumanist Association (WTA),* an international non-governmental organization promoting the ethical use of technology to extend human capabilities. In 2008 the WTA changed its name to *Humanity Plus*.

In 2008 even the Oxford English Dictionary added the word *transhumanism* with the following definition: "[a] belief that the human race can evolve beyond its current limitations, esp. by the use of science and technology."[101] Due to the heterogeneity of the contemporary transhumanist movement it would be difficult to find a more precise definition that simultaneously did justice to the many streams emphasizing and embracing different aspects of the human-technology merger. In recent years Nick Bostrom – head of the Future of Humanity Institute at Oxford University – has been a frequent member of commissions and international projects

[98] Esfandiary, F., M., Upwing Priorities, Future Life Issue 21, June 1981, p. 73.
[99] See Drexler,K., E., Engines of Creation, Anchor Books, New York, 1986.
[100] See Kurzweil, R., op. Cit.
[101] See The Oxford English Dictionary, <http://www.oed.com>

assessing the ethical issues related to human enhancement technologies.

As a result of a broad range of online and real life activities such as organizing conferences, arranging meetings, networking, etc. together with the Institute for Ethics and Emerging Technologies – a major transhumanist think tank – transhumanism has gradually transformed itself from a rather fringe movement in the 1980s and 1990s to an extremely well organized, well represented and omnipresent intellectual position. Especially its proximity to science fiction and popular culture has made its spread very rapid, but transhumanist ideas are also represented in academia and their perspective has gained entry into a number of top level technology assessment and technology foresight documents both in the US and Europe.[102]

Transhumanism represents the most current wave in the long tradition of thought that has embraced the prospect of technologically transforming mankind for the better. It clearly stands in the tradition of meliorism and embraces the Enlightenment idea of liberating man from nature as well as the humanist impetus that defines man as an unsettled being who can freely chose its own destiny.

The End of Utopia?

It becomes clear from this short historic survey that for the most part the idea of human perfectibility had been closely allied to broader concerns about the future of humanity. This is especially true of 20th century visionary projects such as Russian Cosmism or Biofuturism. Even the scientists at the Ciba conference were worried about the development of our species and saw the necessity of a global solution to the challenges we faced. This is especially remarkable since their faith in science and collective visions seems to bear almost no trace of the devastations of the previous two world wars. In a certain sense the utopianism of perfecting humans, banishing death and scarcity and creating a (more) blissful society has survived very long. Yet, by the time we come to transhumanist aspirations we see an important shift. Most transhumanists do not think in terms of broad political projects that also involve the technological transformation of man but rather consider enhancement as a personal issue. So despite the fact that by now even the popular press is full of fantastic images of a bright future that a few centuries ago were only entertained by a select few intellectuals, the truly transformative power of utopias as sources of contemplating political alternatives has faded.

> […] the abandonment of the larger social project connects […] personal utopianism with political cynicism, because it is no longer thought necessary to guarantee to the collective that which is pursued by the individual. Mass utopia, once considered the logical correlate of personal utopia, is now a rusty idea. It is being discarded by industrial societies along with the

[102] NBIC, STOA, Boosting Brainpower, ENHANCE

earliest factories designed to deliver it.[103]

Instead, the prospect of technological self-perfection aligns with philosophies of individualism and capitalism as market mechanisms are deemed optimal to deal with enhancements. From the grand vision of abolishing the ultimate injustice of temporal limitations that heated Russian Cosmists we have come to a mere affirmation of the fact that we just do not want life to end because we do not want to miss out on any opportunities. Similarly, the frightening totalizing grandeur of "cultivating humanity to a higher form" has muted into the equally problematic idea that "Our bodies will be the next fashion statement; we will design them in all sorts of interesting combinations of texture, colours, tones, and luminosity."[104]

The reasons for this change are certainly complex and I will come to discuss one possible interpretation in the third chapter of this thesis.

Summary

We have thus briefly traced the vision of human perfectibility from ancient times to our present day. Hopefully, this chapter has demonstrated that the idea is far from new and has in fact accompanied the history of Western civilization in different forms. There are characteristic types of argumentation and tropes that run through the entire story, such as the commitment to a supposedly humanist idea that man's nature consists in having no fixed nature at all. Man is understood as a free being who has, through the course of scientific development learned to gradually rid itself of limitations and constraints. I will now turn to the contemporary debate where precisely this issue of modifying human nature by technological means is played out between proponents and opponents of enhancement technologies.

[103] Buck-Morrs, S., Dreamworld and Catastrophe, MIT Press, Cambridge Massachusetts, 2000. p. X.
[104] Natasha Vita-More, cited in Brian Alexander, "Don't Die, Stay Pretty: Introducing the Ultrahuman Makeover," Wired 8, no. 1 (January 2000) 6.

- Chapter 2 -

Enhancement and Posthumanity

Chapter Outline

Now that the historical reconstruction of the idea of human perfectibility is complete I turn to a discussion of the contemporary debate about our attempts at modifying human nature. The brief historical survey has shown that the belief in man's nature being ultimately freely formable had been present since Humanism. Debates in the present ignite precisely about this issue, whether can or should transform ourselves without constraints.

As I already mentioned in the Introduction current philosophical positions on human enhancement can be broadly divided into two categories. On the one hand so called bio-conservative authors such as Jürgen Habermas, Francis Fukuyama or Leon Kass argue for the strict control or even ban of enhancements. Their arguments are met by techno-progressive thinkers like Julian Savulescu, Nick Bostrom or Gregory Stock. Of course, this is a rather coarse categorization but it serves well to illustrate the highly polarized nature of the debate. It is an interesting feature that thinkers who find themselves in the company of each other as representing similar views may otherwise show very little intellectual kinship. This is especially true of the bioconservative position, where the Frankfurt School giant Jürgen Habermas may have little in common with the neoconservative Fukuyama.

In this chapter I am going to first sketch very briefly the scientific breakthroughs in molecular biology without which there would be no debate today. Then I discuss a number of authors, namely Habermas, Fukuyama, Stock and Bostrom because their views represent some of the most often referenced standard positions in the debate.

My aim in this chapter is on the one hand to demonstrate how bioconservative positions revert to a form of essentialism in conceptualising human nature. On the other hand, I intend to show that technopogressive arguments are caught in a paradoxical fantasy of liberation and emancipation. I claim that the problems of these positions result in both cases from a separation of the object from the subject that is characteristic of philosophical modernity and which treats the essence of man separable from nature and technological interventions. Whereas bioconservatives believe that technologies impinge upon a separate human essence or nature, progressives hold that by submitting nature to technological control we can attain freedom of the subject. Instead of these positions I argue with Hayles and Haraway for a more ambiguous relationship between man and technology and a different notion of posthumanism that takes the inseparability and mutually

constitutive nature of man and technology as a starting point.

How We Learned to Engineer Ourselves

The first major scientific breakthrough that serves as the precondition of the entire debate about genetic enhancements was the identification of the DNA molecule's physical structure by James D. Watson and Francis Crick in 1953. By unravelling how the four nucleotide bases adenine, cytosine, guanine and thymine were paired to form the double-helix structure they dissolved one great mystery of genetics and transformed it into straightforward chemistry.[105]

The second major breakthrough came with Fred Sanger in the mid 1970s who found a method of reading long strands of DNA in an accessible manner. He used different chemicals that selectively attached to only one of the four bases thereby providing the gene sequence. Thus, within twenty years of the discovery of the structure of DNA science advanced to having recombinant DNA methodologies that allowed for the splicing and pasting of DNA sequences of different origin, enabling the creation of hybrid organisms. This was the birth of genetic technologies and 1976 marks the foundation of the first such company Genentech Inc., which brought to market the first medicinal product created via recombinant DNA methodologies, namely synthetic human insulin.[106]

As Rheinberger and Müller-Wille note recombinant DNA methodologies and the implementation of molecular processes in machines have effectively engendered a new paradigm as the basis of molecular biology. It was no longer the case that scientists needed to create optimal in vitro conditions in order to study organisms but rather that the cellular milieu itself had become a site of experimentation. The goal was no longer the extracellular representation of intracellular processes, but the exploitation of biological mechanisms to realize extracellular projects.[107] It marks the birth of synthetic biology – something that has become a catch-phrase recently – where it becomes possible to utilize cellular processes for the creation of novel biological entities. It also marks the convergence of biological science with engineering, representing in effect the „rewriting" of life. This paradigm shift was the precondition of contemporary talk of biology becoming more „open" to intervention. David Jackson brought the possibilities of genetic engineering to a succinct

[105] The discovery of the double-helix structure is in fact one of the greatest controversies of genetics, as the most crucial pieces of data, an X-ray diffraction photograph and some calculations made by Rosalind Franklin were known to Watson and Crick though they never disclosed this fact until after the early death of Franklin. The two men received the Nobel Prize in 1962 without any acknowledgment of Franklin. Ruth Hubbard notes that the most amazing aspect of this story is probably that it has not become a world-shattering scandal. For more see: Hubbard, R., Science, Power, Gender: How DNA Became the Book of Life, Signs, Vol. 28, No. 3, Gender and Science: New Issues (Spring, 2003), pp. 791-799.

[106] Rheninberger, HJ., Müller-Wille, S., Technische Reproduzierbarkeit organischer Natur – aus der Perspektive einer Geschichte der Molekularbiologie, in Weiss, M.,G., (ed.) Bios und Zoë, Suhrkamp, Frankfurt am Main 2009. p 17.

[107] Ibid. P 13

point in a lecture under the revealing title *DNA: Template for an Economic Revolution*:

> I would argue that the ability to read, write and edit DNA is functionally unprecedented in human history. All we have ever been able to do before is to select among the various combinations of genes that the mechanisms of genetics have presented to us. And, while we have developed very powerful and sophisticated selection procedures, selecting from among a set of alternatives over which one has almost no control is fundamentally different from being able to write and edit one's own text. […] the ability to write and edit DNA is the basis for a synthetic and a creative capability in biology that has not previously existed.[108]

This type of language has established the metaphor of the DNA as a kind of text that we are now learning to read and may soon be able to edit also in the case of humans. The genome became the equivalent of a code that we are increasingly in a position to crack.

Debates about safety issues related to genetic engineering sprung up quickly and following serious initial concerns and doubts seemed to have come under control by the 1980s as actors recognized that under careful control and adequate safety measures the possible gains far outweighed supposed and feared risks.[109] However, the debate is far from settled as constant controversies over the use of genetically modified organisms show.

These developments concerned mainly agricultural and medicinal products. The next great source of disagreement was the arrival of "test tube babies", in-vitro fertilization. This has inflamed debates about the manufacturing of humans in laboratories and ignited some, such as Leon Kass to call it a war against human nature that ultimately leads to "the divorce of the generation of new human life from human sexuality and ultimately from the confines of the human body"[110] Kass has later changed his mind and considers IVF appropriate as a treatment. However, IVF in effect is the precondition of enhancement oriented reproductive technologies and serves as a threshold or Rubicon that had already been crossed. IVF involves the creation and discarding of human embryos so any consistent position arguing against genetic enhancements would have to be also against IVF. In any case, it turned out that Louise Brown, the first test-tube baby born in 1978 was also just a normal human whose existence did not assault humanity and explode values. By now IVF has mostly been firmly established as a form of infertility treatment what makes the case of people like Kass quite difficult but the debate about the ethicality of the procedure still continues.[111]

Moving on in the history of reproductive technologies we come to the birth of Dolly the sheep in 1996 that is: cloning. Put very simply the procedure of cloning by Somatic Nuclear Cell Transfer involves taking an adult cell, transferring its nucleus into an egg cell and then chemically "convincing" it to become a fertilized zygote that can then be implanted into the "mother." By this

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[108] Jackson, D., A., DNA: Template for an Economic Revolution, in Chambers, D., A., (ed.) The Double Helix: Perspective and Prospective at Forty Years, New York 1995, P. 364.
[109] Gottweis, H., Genetic Engineering, Discourses of Deficiency, and the New Politics of Population, in Taylor, P., Halfon, S., Edwards, P., (eds.) Changing Life, University of Minnesota Press, 1997, Minneapolis p. 70.
[110] Leon Kass quoted in Marantz Henig, P., Pandora's Baby Houghton Mifflin, New York 2004. p. 70.
[111] See for example Warnock, M., Making Babies: Is there a right to have children?, Oxford University Press, 2002.

procedure it is possible to create belated genetically identical twins.[112] The fact that the first cloned being was a sheep was like adding oil to fire and engendered similar reactions as IVF did two decades earlier. It seemed like biotechnology by making copies of living beings had made the mass manufacture of humans possible. A huge debate erupted over the permissibility of human cloning, which was rejected by most scientists. Nevertheless, some hoax figures have claimed to have successfully cloned humans.[113] The nature of the debate changed as scientists discovered human embryonic stem cells that had the capability of developing into any kind of somatic cell. The new concepts of therapeutic cloning, as opposed to reproductive cloning emerged.

Whereas the universally rejected reproductive cloning would mean the creation of an embryo with the intention of carrying it to term, therapeutic cloning involves the creation of cloned embryos for the purpose of extracting stem cells and developing these into whatever is needed by the patient, such as liver cells, nerve cells, skin cells, etc. This prospect is the catalyst of the vision of regenerative medicine and prospect of radically prolonged lives.[114]

In the words of Gregory Stock, reproductive human cloning – the creation of belated genetic twins – is an uninteresting technology that bears neither therapeutic nor enhancement promises and would be profoundly dangerous and immoral to try due to the dangers involved.[115] Dolly was the result of hundreds of failed attempts and developed many diseases before her early death so a similar procedure is ruled out in the case of humans. As regards therapeutic cloning, the debate rages on about the moral status of the embryo and the legitimacy of creating life for the purpose of exploiting it.[116] Unfortunately, the discussion of this debate is not possible within the scope of this thesis.

Finally, a huge step in the development of bioscience was the start of the Human Genome Project, which aimed at decoding the sequence of human DNA. It started in 1990 and was an international joint venture that later developed into a competition between the publicly funded HGP and the private initiative of Celera Inc. In order to avoid patenting parts of the human genome massive amounts of data were published daily in the open access database GenBank.[117] The Humane Genome Project was a research undertaking of truly epic proportions and was driven by the equally grand aspiration to unlock the genetic code of human life. The project was fuelled by the expectation to uncover the „Holy Grail" of genetics and „promised to reveal the genetic blueprint

[112] For a simple explanation of the procedure see Genetic Science Learning Center website of the University of Utah. http://learn.genetics.utah.edu/ Last retrieved 18 August 2010.
[113] BBC News, 23 December 2005. S Korea cloning research was fake, http://news.bbc.co.uk/2/hi/asia-pacific/4554422.stm Last retrieved 20 August 2010.
[114] Levine, A., D., Cloning, Oneworld, Oxford, 2007
[115] Stock, G., Redesigning Humans, Mariner Books 2003
[116] Ibid.
[117] See the GenBank homepage at http://www.ncbi.nlm.nih.gov/sites/entrez?db=nucleotide Last retrieved 20 August 2010

that tells us who we are."[118] Thanks to exponential increases in computing power the project finished ahead of schedule. The announcement of the first draft of the human genome at the White House in 2000 was a grandiose event where President Bill Clinton used truly elevated words to describe this landmark achievement.

> Today's announcement represents more than just an epic-making triumph of science and reason. After all, when Galileo discovered he could use the tools of mathematics and mechanics to understand the motion of celestial bodies, he felt, in the words of one eminent researcher, "that he had learned the language in which God created the universe."
> Today, we are learning the language in which God created life. We are gaining ever more awe for the complexity, the beauty, the wonder of God's most divine and sacred gift. With this profound new knowledge, humankind is on the verge of gaining immense, new power to heal. Genome science will have a real impact on all our lives -- and even more, on the lives of our children. It will revolutionize the diagnosis, prevention and treatment of most, if not all, human diseases.[119]

This insight has provoked significant anxieties and the prospect of learning and eventually manipulating this „code of codes" provided impetus for broad and multi-faceted philosophical and ethical discussions.

The Human Zoo

Turning more closely to enhancement uses of medical technology and the transformation of humans, a great controversy emerged following Peter Sloterdijk's polemical lecture held in 1999 under the title "Rules for the Human Zoo", which was meant to be a reply to Heidegger's *Letter on 'Humanism'*. In this lecture Sloterdijk interpreted humanism as a form of literary society held together by long letters written by its members to each other. In his view humanism was nothing less than mankind's attempt at taming itself and preventing a slide into barbarism. Yet, he views this attempt as having failed once and for all. Hence, he poses the question: "What can tame man, when the role of humanism as the school for humanity has collapsed?"[120] How to tame the man of the future once the classical literary society has turned out to be ineffective? Sloterdijk considers the growing manipulative power of genetic technologies and presents the image of a human zoo that would transform all matters hitherto deemed political in nature to questions about the proper regulations of „man-breeding". In the future the gulf between the literate and the illiterate that has characterized humanism will give way to the power structure of the breeders and the bred. After a tour de force through the writings of Nietzsche and Heidegger, Sloterdijk settles by a discussion of Plato's dialogue *The Statesman*, which he interprets as a conversation between shepherds about the

[118] Keller, E., F., Century of the Gene, Harvard Univesity Press 2000. p. 4.
[119] National Human Genome Research Institute http://www.genome.gov/10001356
[120] Sloterdijk, P., Rules for the Human Zoo: a response to the Letter on Humanism, Environment and Planning: Society and Space 2009, volume 27, p. 20.

art of man-breeding.

Sloteridjk's text laments over the passing of the era of humanism's literary society in a sometimes melancholic and ambivalent tone, but he also uses very harsh words and concepts that have a sinister past. Understandably his use of such words as „breed" and statements like "for the next period of time species politics will be decisive"[121] or "it will become necessary in the future to formulate a codex of anthropotechnology"[122] have caused much incomprehension and even an outright scandal. Though Sloterdijk probably understood his own text as discussing the arrival of a post-literary and post-humanist society following the breakup of classical humanism he had been taken as advocating a new program of eugenics. His vague formulations, controversial choice of words and the general sensitivity of the subject in Germany have given rise to a long lasting philosophical scandal that incited some of the greatest thinkers to voice their opinion.

Now I am going to turn to Jürgen Habermas' major intervention in the debate, which was partly motivated by his furore about the Sloterdijk lecture and developments around the Human Genome Project he considered troubling.

Habermas and the Ethical Self-Understanding of our Species

Already at the time when genetic engineering was still a thing of the future Robert Nozick made some prescient remarks in his book *Anarchy, State and Utopia*.

> Consider […] the issue of genetic engineering. Many biologists tend to think the problem is one of design, of specifying the best types of persons so that biologists can proceed to produce them. Thus they worry over what sort(s) of person there is to be and who will control this process. They do not tend to think, perhaps because it diminishes the importance of their role, of a system in which they run a "genetic supermarket," meeting the individual specifications (within certain moral limits) of prospective parents […] This supermarket system has the great virtue that it involves no centralized decision fixing the future of human type(s).[123]

The notion of a genetic supermarket and the specific content of "certain moral limits" have been intensely debated ever since. The fear of the resurgence of eugenics in a system driven by market forces and consumer demand has been omnipresent and in 1991 Abby Lippman coined the term "geneticization", which she defined as a "process by which differences between individuals are reduced to their DNA codes."[124] The dystopian prospect of a world along these lines was forcefully depicted in the 1997 movie GATTACA.[125]

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[121] Ibid p. 24
[122] Ibid p. 24
[123] Nozick, R., Anarchy, State and Utopia, Basic Books, New York, 1974, p. 315n.
[124] Abby Lippman, "Prenatal Genetic Testing and Screening: Constructing Needs and Reinforcing Inequities," American Journal of Law and Medicine 17 1991: p. 19.
[125] Note that the title of the film comprises only the letters of DNA base pairs, GATC.

Without explicitly acknowledging it Habermas has also picked up on this line of concerns in 2001 when he published his book *The Future of Human Nature* but he has developed a unique argument. Habermas deals mainly with such practices as pre-implantation genetic diagnosis, which is a method employed in IVF in order to screen for eventual genetic diseases. The procedure allows for the prospective parents to select only those embryos for implantation that are free of the genes associated with specific diseases that might run in the family. Besides this method Habermas also considers technologies that are not presently available such as the direct manipulation of human embryos with the aim of changing their genetic constitution. He believes it is necessary to ponder possibilities that are perhaps distant or may never materialize for it is much better to contemplate the impossible than to be caught by surprise.

He uses quite strong words to condemn certain practices, such as the "perversely-delayed use of frozen egg cells"[126] and his overall tone suggests deep concern over the subject. Habermas is worried that the immense financial gains that are associated with biotechnological progress might overrun public ethical debates and considerations. He is mostly disturbed by the possibility that self-instrumentalizing practices such as PID, genetic engineering or stem cell technologies might make us "swap [our] sensitivity regarding the normative and natural foundations of [our] existence for the narcissistic indulgence of our own preferences."[127] By this he means that we might come to live in a society where market mechanisms are employed to select or create coming generations, so that the decision about an individual's existence will come to be predicated upon the possession of certain biological traits. Habermas likens this system to an initial quality control that serves as the precondition of entering life altogether and he attempts to provide an argument against such use before we slide into an era of liberal eugenics. These tendencies would exacerbate the "colonization of the lifeworld" by the calculating rationality of instrumental technology. His aim is to ensure that we stick to a "logic of healing" and use technologies where they are appropriate but avoid self-instrumentalization altogether.[128] The attempted solution is quite complex but as I intend to show it fails to accomplish what it sets out to achieve.

First of all, Habermas believes that we cross a crucial line once we start to apply the method of manipulation and control not only to "outer" nature but also to our "inner" nature too. This step warrants critical concern. However, he rejects the simple approach of van Daele to moralize human nature by artificially erecting a boundary and saying: hither but no further! Habermas recognizes that this kind of arbitrary resacralization or sanctification of that what science and technology have made accessible, malleable and disenchanted is not the correct path to pursue or one that can be philosophically maintained. Habermas intends to speak of the moralizing of human nature in a

[126] Habermas J., Future of Human Nature, Polity 2003. p 16.
[127] Ibid. P. 20
[128] Ibid.

rather different sense. As he says:

> A quite different scenario, however, emerges if "moralizing human nature" is seen as the assertion of an ethical self-understanding of the species which is crucial for our capacity to see ourselves as the authors of our own life histories, and to recognize one another as autonomous persons. [129]

These lines contain all the key concepts and in fact the essence of the entire book. Habermas attempts to moralize human nature by showing that self-instrumentalizing practices are an assault to the ethical self-understanding of our species and would undermine the possibility of autonomy. Furthermore, he intends to show this in a manner that is true to our post-metaphysical era, that is, without recourse to any particular faith or concept of the Good for he recognizes that modern pluralistic societies must generate moral cohesion and forms of legitimation from within their own resources. For Habermas this represents the "increasing reflexivity of a modernity that realizes its own limits"[130] and he locates these necessary resources in webs of interpersonal relations of mutual respect. To be sure, this is perhaps the greatest challenge, since bioethical debates are perplexing as they are precisely because they make judgments about the value of life and certain practices and institutions unavoidable. Finding a mutually acceptable, rational common ground in this terrain that is not committed to any particular view of life and the Good is therefore extraordinarily difficult. For the noted bioethicist Engelhardt consensus is not likely to emerge from bioethical debates because

> […] parties are separated by incompatible metaphysical commitments (e.g., embryos do or do not have an immortal soul), religious moral beliefs (e.g., euthanasia does or does not involve the sin of murder), and by divergent rankings of cardinal moral concerns (e.g., the claims of security do or do not trump concerns for prosperity).[131]

In either case, Habermas attempts to articulate such a theory in order to ensure the "right to a genetic inheritance immune from artificial intervention"[132] The first difficulties arise here, because artificiality is not clearly defined, but Habermas most probably means interventions via genetic technologies such as germline genetic engineering. This would mean however, that a germline intervention to enhance is rejectable and should be banned on the grounds of being artificial, whereas any other practice regardless of its effect on the foetus, such as alcohol consumption – to use an exaggerated example -, which is known to severely impact foetal development does not count as an artificial intervention and can thus be morally condemned at most, but is no assault on the ethical self-understanding of the species.

Habermas considers instrumentalizing technological manipulations to be assaults on human dignity. However, in his view dignity is not a characteristic that one can possess or lose but rather it

[129] Ibid. P. 25.
[130] Ibid. P. 27.
[131] Engelhardt, H., T., 'The Search for Global Morality:Bioethics, the Culture Wars, and Moral Diversity' in *Global Bioethics: The Collapse of Consensus*, H T Engelhardt (ed) M & M Scrivener Press, 2006, p. 28.
[132] Habermas op. cit. p. 27

is connected to a sense of relational symmetry that exists in communicative situations.

Habermas also draws on Hannah Arendt's concept of *natality*, which Arendt understood as the abysmal foundation of man's ability to act in the world. As she wrote: "Because they are initium, newcomers and beginners by virtue of birth, men take initiative, are prompted into action."[133] This served to express the idea that free acts of persons could not be traced back to any reason or ground other than themselves, their being born. The natality of every man by virtue of bringing something new into the world also stands for that individual's capability to initiate novelty.

Habermas in turn argues that the unmanipulated, chance birth of each and every individual regardless of class, race, gender, etc., guarantees that they will be free and autonomous authors of their own life history. Even though environment, education, upbringing and a range of other factors might play a role and exert considerable influence it is still possible to take a communicate stance towards these. For Habermas this holds true even for the earliest influences of upbringing, which he sees as involving reasons and grounds on the side of the parents, which can retrospectively be grasped or worked upon and its effects eventually transformed. As opposed to this kind of relationship genetic interventions would change the very substrate of life and the preconditions of all future communicative relationships in a way that excludes the affected individual. Thus, it would be impossible to take a communicative stance to an altered genetic constitution because it is by definition not a dialogical but a one-way process. Habermas supposes that it is possible to employ genetic technologies to completely determine future individuals' traits and uses the term "programming" to describe this.

> Eugenic programming of desirable traits and dispositions, however, gives rise to moral misgivings as soon as it commits the person concerned to a specific life-project or, in any case puts specific restriction on his freedom to choose a life of his own.[134]

This line of argumentation seems rather convincing at first sight and the implied comparison of the grown and the made, between programmed and free individuals seems plausible. However, there are a number of problems with Habermas' proposal.

First of all, while he attempts to distinguish therapy from enhancement he offers no clear-cut criteria to do so. It seems quite problematic that Habermas does not reflect at all on the process of medicalization and the social construction of disease itself. How is it that certain conditions come to be seen as diseases and which of these warrant a genetic intervention? If Habermas is worried about sliding into a society that trades moral concerns for the "narcissistic indulgence of our own preferences" then it would seem necessary to reflect on the processes as a result of which any condition turns out to be pathological. As the range of phenomena over which medicine has the final word gradually expands there is growing concern that aspects of everyday life are gradually

[133] Arendt, H., The Human Condition, University of Chicago Press, 1958. p. 177
[134] Ibid. P. 61

turned into pathologies, "narrowing the range of what is considered acceptable."[135] This trend is definitely on the rise and it increasingly includes such "personality traits" as sadness, shyness, etc.[136] Adding to the trend of medicalization is the general orientation towards a search for genetic causes, which makes Habermas' attempt to consider therapeutic interventions unproblematic highly questionable.

It further seems justified to say that Habermas entertains two somewhat conflicting notions at the same time. On the one hand he allows for the possibility of interventions aimed at treatment, because these – at least supposedly – take the dialogical principle of counting with the possible consent of the other seriously. On the other hand, enhancing interventions are rejected outright because they irrevocably undermine individual autonomy. So there seems to be a very strange biologism at work here that treats the untouched – or at most restored to "health" – state of the genome as the precondition of autonomy. But this move, equating an unenhanced genome with the precondition of autonomy seems to be a highpoint of biologism for it degrades humans to completely determined creatures.

Finally, the argumentation and the claims Habermas puts forth get weaker and weaker as we progress. As we have seen, it ultimately takes the form of a conditional sentence: "gives rise to moral misgivings *as soon as* it commits the person concerned to a specific life-project"[137] But it is far from clear when and if this kind of limitation is true of such interventions. What started out as an assault on human dignity, the radical transformation of the ethical self-understanding of our species and similarly bloated claims mutates towards to end of the book to a mere supposition. Habermas recognizes namely, that genetic technologies are not problematic per se, but rather certain applications of them are. What applications? Applications aimed at improvement. Why? For the supposed reason that

> Eugenic interventions aiming at enhancement reduce ethical freedom insofar as they tie down the person concerned to rejected, but irreversible intentions of third parties, barring him form the spontaneous self-perception of being the undivided author of his own life. Abilities and skills may be easier to identify with than dispositions, let alone properties, but the only thing that counts for the psychical resonance of the person concerned is the intention associated with the programming enterprise. Only in the negative case of the prevention of extreme and highly generalized evils may we have good reasons to assume that the person concerned would consent to the eugenic goal.[138]

It is rather remarkable that Habermas positions himself as an expert on the "psychical resonance" of persons and claims that no one would ever retrospectively consent to anything other than measures taken to avoid some "extreme and highly generalized evil", whatever that could be. If we supposed

[135] Conrad, P., The Medicalization of Society, Johns Hopkins University Press, 2007. p 7.
[136] See for example Horwitz, A. W., Wakefield, J. C., The Loss of Sadness - How Psychiatry Transformed Normal Sorrow into Depressive Disorder, Oxford University Press, New York 2007.
[137] Habermas op. cit. p. 61 (The italics are mine.)
[138] Ibid. P. 63.

for a moment that the urban legend were true that listening to Mozart during pregnancy increased the intelligence of the child would Habermas condemn the parent for her intention to enhance? Unfortunately, we do not get any examples from Habermas for an intervention that would limit and block the child's open future. Would enhanced intelligence, musical talent, mathematical skill, sports ability bar the child from an open future? It rather seems that enhancing a number of traits opens possibilities instead of blocking them.[139] So Habermas's fear about blocking the child's open future if the intervention locks him on a certain path – although I am not sure what kind of intervention could do that – seems more directed at what Michael Sandel has called "hyperparenting" namely the parental intention to create children who fulfil certain goals set by the parent, such as a career in music, sports, or whatever.[140] Yet, the existence of hyperparenting practices is not in itself an argument against the technology of genetic enhancement, because the child's' curbed autonomy is not the result of a technological intervention but rather the complex interaction between parental expectations, child-rearing practices and *also* the technological possibility.

Furthermore, his notion that a chance birth enables us to become the 'undivided autonomous authors of our life history' draws on an understanding of autonomy that seems unwarranted. Even though a distinction between genetic and other forms of exerting influence, such as upbringing can seem justified, still, the claim seems overstated that the former undermines the possibility of individual autonomy whereas the latter leaves it untouched.

The use of the term "ethical self-understanding of the human species" also seems problematic, especially if we consider that Habermas repeatedly stressed the fact that bioethics is characterised by conflicting views that are informed by divergent cultural, philosophical and other convictions. Yet, he constantly speaks of "us" as sharing his version of the ethical self-understanding of our species. He justifies this move with recourse to the fact that major religions converge on this issue of a "minimal ethical self-understanding of the species".[141] However, this is quite troublesome once we recognize that in fact religions greatly diverge on this issue. So for example the Judaic tradition considers any technology that humans *can* develop as "an uncovering of another method built into creation by G-d for mankind to use in positive ways."[142] In Rabbi Barry Freundel's view the challenge lies in using these technologies wisely, but he explicitly favors life extending interventions, since „Every hour added to someone's life comes with the possibility of doing good deeds and repentance and is, therefore, more valuable in this way than all of life in the

[139] Bostrom, N., In Defense of Posthuman Dignity, in: Bioethics, Vol. 19, No. 3, pp. 202-214
[140] Sandel, M., The Case Against Perfection, Harvard Univesity Press, 2007. p. 52.
[141] Habermas, op. cit. p. 40.
[142] Rabbi Freundel, B., Gene Modification Technology, in Stock, G. and Campbell, J. (2000). Engineering the Human Germline. New York: Oxford University Press. P. 119.

world to come."[143] As we can see, this line of reasoning dissolves the grounds of speaking of artificial interventions at all and leaves only wise and unwise uses. Furthermore, as the prevention of suffering counts as a chief moral concern in Judaism the prevention of the birth of children with genetic diseases can be seen as a moral duty that certainly does not lie outside the realm of the "natural".[144]

It is also worth considering how Habermas uses the term "insturmentalizing" or "self-instrumentalizing." It is greatly reminiscent of the Kantian distinction between persons and things. Whereas persons belong to the realm of moral subjects who are autonomous, things are determined and manipulable. The problem with current biotechnologies is that they increasingly make our biological life contingent on choices. So Habermas might fear that as a result we may cease to be persons, lose our autonomy and become degraded to the level of things. This seems somewhat problematic even if we take Habermas' inspiration, Kant as our guide. As Paul Rabinow points out, in the formulation of his ethical imperatives Kant was much less categorical and exclusive as Habermas. Kant wrote: "So act as to treat humanity, whether in thine own person or in that of any other, in every case as an end withal, never as a means only."[145] As Rabinow remarks, adding the word „only" opens a „crucial space of reflection and action."[146] The lack of this crucial space of reflection and action is evidenced by Habermas' own struggles with and ultimate failure in delineating therapy from enhancement, because each form of treatment always and necessarily treats the person also as a means in that it employs the instrumentalizing attitude of science. In a later section I am going to argue that we should probably do away with this kind of conceptualization altogether that tries to keep human subjectivity, autonomy and freedom separate and distinct from technological impingement. Ironically, it is Hannah Arendt – among others – who brought our intertwined relationship with the myriad things of the world pointedly to expression by saying "Whatever touches or enters into a sustained relationship with human life immediately assumes the character of a condition of human existence."[147]

All in all, Habermas' argument relies on a very strong concept of autonomy and a form of biologism and genetic determinism that had been discredited by the very Human Genome Project that partly motivated him to pen his thoughts on the subject. Habermas writes on the reductionist assumption that it is or will be possible to establish a clear correlation between almost all traits a human being can possess and the genome itself and even locates the source of our ethical self-

[143] Ibid. P. 121.
[144] See for example Sherwin, L. B., Jüdische Ethik für das 21. Jahrhundert. Klonen und Fortpflanzungstechnologie, in: polylog. Zeitschrift für interkulturelles Philosophieren, 2005/13
[145] Kant, I. 1949. Fundamental Principles of the Metaphysic of Morals. New York: Liberal Arts Press. P. 13.
[146] Rabinow, P., Marking Time – On the Anthropology of the Contemporary, Princeton University Press, Princeton NJ. P. 22.
[147] Arendt, H., The Human Condition, University of Chicago Press, 1958, p. 9.

understanding in a – more or less unmanipulated – biology. That is, he seems to suppose a straight line leading from genotype to phenotype. I will critically engage with this assumption and describe the paradigm shift that has taken place since the Human Genome Project's completion in Chapter 3.

In the next section I turn to Francis Fukuyama who has also played an important role in the development of the debate also as a member of the U.S. President's Council on Bioethics from 2001-2005.

Fukuyama and the Slide into Posthumanity

Francis Fukuyama first made a name for himself by arguing with Hegel that the global spread of liberal democracy and the fall of Communism represent the end of history. No real contestants of the political system of liberal democracy are in sight and the progression of science can be seen as one of the key drivers of this process, thus the historical process of political advancement is concluded.[148] Certainly, this is not the place to discuss his thesis, which he himself has later come to revoke. More interesting are his reasons for abandoning it. Besides the events of 9/11 the main reason for his change of mind was that in his view biotechnological advances posed significant challenges to the way we think about politics. In a series of articles and books since 1999 Fukuyama has become one of the key critiques of biotechnologies and an outspoken opponent of streams of thought like transhumanism. In a short article in 2004 he even proclaimed transhumanism to be the "world's most dangerous idea"[149]. In the following sections I am going to discuss his line of argumentation because it has greatly influenced the debate.

Already in the introduction to the aforementioned article Fukuyama presents transhumanism, in a rather cynical tone, as a "strange liberation movement" united under the banner of transcending human biological constraints, which we might just as well reject out of hand for its inherent absurdity. However, as he goes on, the situation is not so straightforward if we consider that current biomedical research often formulates similar goals. He lists the examples of prenatal genetic diagnosis, mood altering psychopharmacological substances and gene therapy. Certainly, only a handful of people would want to restrict the medical and therapeutic use of such technologies and once we consider how laborious, painful and limited human life can be we might even come to view transhumanism as an attractive and rational approach. The danger of tranhumanism according to Fukuyama is precisely that by receiving it in minor doses, step by step we might slide over and not notice its imminent threats and the grave moral price we would have to pay.

In his view the first victim of transhumanism would be political equality, which rests upon

[148] Fukuyama, F., The End of History and the Last Man, Avon Books, New York 1992.
[149] Fukuyama, F., Transhumanism, in Foreign Policy, 1 September 2004.
http://www.foreignpolicy.com/articles/2004/09/01/transhumanism Last retreieved 20 August 2010

the belief that there is a common human essence in virtue of which all humans are endowed with an inherent value and are inviolable beings. In light of this common human essence all eventual differences of race, gender, intelligence, looks, abilities, etc. are dwarfed. The bloody and bitter battles for political rights throughout history have gradually established that this inviolability is acknowledged simply due to our common, shared humanity. The threat of transhumanism lies precisely in its goal of upsetting this foundation of political liberalism by changing the human essence.

He asks: What sorts of rights would enhanced beings demand for themselves? What consequences would such developments have for the poorest countries, which would irrevocably be left out of the business of enhancement thereby deepening the already huge divide? If some can perfect themselves can anyone allow to be left behind?

He further criticizes transhumanists for their supposed belief that it is possible to simply rid ourselves of unwanted characteristics and traits while perfecting the rest. Fukuyama draws attention to the interrelationship between our "good" and "bad" traits and towards the end of his article he warns of the perils of a dehumanized transhumanist future. I believe Fukuyama's argumentation consists of three basic points:[150]

1: there is something we can call "human essence"

2: only those beings or individuals who possess this essence are endowed with inherent value and inviolability

3: transhumanist aspirations would demolish or alter this essence

His conclusion that we must do everything in our power to prevent such ideas from becoming reality because they would undermine political equality flows naturally from his premises. I will now consider how consistent this type of argumentation is, looking first briefly at his second and third premises and finally at the first one in a more detailed manner.

His assumption seems unfounded that only those endowed with the mysterious human essence can bear political rights and possess inherent value, whatever this value may mean. This becomes clear once we ask the question whether any human being who had been subjected to biotechnological manipulations of the like Fukuyama fears would lose his/her political rights and be stripped of moral status; or conversely, whether we would revoke the political rights of unenhanced human beings should radical enhancement become the norm. Finally, if we were to encounter an alien being who showed all signs of being capable of moral judgement, sentience, etc., would we not treat it as a moral agent simply in virtue of the fact that it lacked the 'human essence'? I believe the answer is 'no' in all cases which suggests that human essence is not a necessary precondition of

150 In the reconstruction of Fukuyama's argumentation I rely on Nick Bostrom: Transhumanism: The World's Most Dangerous Idea? http://www.nickbostrom.com/papers/dangerous.html Last retrieved 20 August 2010

moral status and that changes to it would not undermine moral status either. In fact by theoretically distributing and revoking political rights on the grounds that some may have a different "essence" Fukuyama effectively continues the very line of thought from which he intended to save us all. The central tenet of liberal democracies maintaining that all are equal does not refer to a literal equality in the sense of similarity in capacities and traits but rather an equality of rights and obligations. As a result we have no reason to suppose that any technological manipulation could undermine the concept or change the distribution of political rights. Supposing the opposite would mean that we considered certain – biological – traits as indispensable for joining the community of equal individuals. Consequently, it can be stated that transhumanist aspirations to prolong life and enhance cognitive and other capacities would not upset political rights even if they changed the mysterious human essence.

Let us now consider the first premise concerning the existence of a "human essence". Fukuyama's article does not give us clear orientation about this notion but his book *Our Posthuman Future* does, even though it refrains form the use of the word "essence" but rather reverts to "human nature", which is used in a similar sense. Quoting Huxley's *Brave New World* Fukuyama writes:

> The aim of this book is to argue that Huxley was right, that the most significant threat posed by contemporary biotechnology is the possibility that it will alter human nature and thereby move us into a "posthuman" stage in history[151]

We may thus draw the conclusion that "human nature" and "human essence" are interchangeable concepts that have the following features: "Human nature is the sum of the behaviour and characteristics that are typical of the human species, arising from genetic rather than environmental factors."[152] Fukuyama acknowledges that this definition and especially the word "typical" may need further exposition so he adds: "[…] typicality is a statistical artefact – it refers to something close to the median of a distribution of behaviour or characteristics."[153]

Human nature is thus none other than the statistical mean of a set of traits, behaviours and characteristics defined by the genetic constitution of humans. There is no doubt that behavioural, and evolutionary biology are capable of providing such a human behavioural complex but is this enough to serve the purpose Fukuyama intends for it? It turns out that human nature/essence is not something mysterious but the result of a series of chance evolutionary mechanisms that has become open to intervention by the 21st century. What is more, it has always been in constant interaction with our companion species as well as with a host of other factors ranging from bacteria to the innumerably rich achievements we call human culture.[154] Fukuyama also seems to fall into a kind of biological essentialism when he supposes that this set of traits is somehow normative and

151 Fukuyama, F., Our Posthuman Future, 2002. Picador Press, New York p. 7
[152] Ibid. P. 130
[153] Ibid. p. 130.
[154] Haraway, D., When Species Meet., University of Minnesota Press, 2008.

constitutive of political equality. His attempt at "rescuing" the concept of equality through recourse to a human essence ultimately ends in biologism.[155]

Fukuyama himself recognizes that his point does not rest on entirely solid grounds so he goes on to add that the ultimate basis of equality and moral worth is an indefinable "Factor X". This is what remains when individuals are stripped of all accidental properties and this Factor X is the basis of human dignity. However he tries to clarify his point Fukuyama's position seems to be an incoherent mixture, which is further confused by his introduction of the term Factor X and human dignity. As the most decisive *Encyclopedia of Bioethics* notes human dignity is a notoriously problematic and vague term that can be employed to argue for opposing bioethical positions.[156] In Fukuyama's definition

> Factor X cannot be reduced to the possession of moral choice, or reason, or language, or sociability, or sentience, or emotions, or consciousness or any other quality that has been put forth as a ground for human dignity. It is all of these qualities coming together in a human whole that make up Factor X.[157]

This addition only makes his position more incoherent for a number of reasons. First of all, it is still by far not clear why an enhanced human being could not possess any or all of the above traits in a (post)human whole or why such a being would not recognize the unenhanced as a moral agent with equal rights. Furthermore, the previously more or less concrete set of genetically defined traits that Fukuyama identified as "human nature/essence" has now miraculously muted into a mixed list under the mysterious heading "Factor X". It seems Fukuyama's intention is precisely to uphold the mystery, when he says "What this whole is and how it came to be remains, in Searle's word, "mysterious"."[158] Fukuyama argues for a qualitative leap, which is by definition unexplainable that occurred in the process of evolution from prehuman ancestors to human beings. This leap also takes place in the development of each human from a cluster of molecules to a person. Fukuyama is thus a Mysterian who seems to hold the view that it is this mysterious origin that serves as the foundation of our ability to value someone or something and that with the possibility of providing a certain explanation and the option of manipulation this valuation and appreciation would cease. The problem with Fukuyama's position is thus two-fold. On the one hand, it seems to employ biologism in order to establish species-typical traits as the foundation of equal rights. On the other hand he reverts to mysterianism to argue that a cryptic and indefinable Factor X gives humans dignity. Both Factor X and species-typical traits are endowed with a normative binding force that precludes biotechnological modifications.[159] Both positions seem untenable and even incompatible

[155] Weiss, M., G., Die Auflösung der menschlichen Natur, in Weiss, M.,G., (ed.) Bios und Zoë, Suhrkamp, Frankfurt am Main 2009.
[156] Killner, J., F., Human Dignity, in Post, S., G., Encyclopedia of Bioethics, Thomson Gale, 2004. pp. 1193-1120.
[157] Fukuyama op. cit. p. 171
[158] Ibid. P. 170.
[159] Even though the focus of this thesis is not ethics I want to remark that I deeply disagree with Fukuyama on these

with each other.

Bioconservative concerns over the ethical and social aspects of human enhancement technologies bear great importance, however, this is certainly not the point dividing the two camps. Whereas transhumanists look for the broadest possible, yet ethical use of these technologies bioconservatives reject them in the name of protecting human nature. Nonetheless evoking naturalness as a source of normativity is unfounded. This type of argumentation – as we have seen – results in biologism and circumvents the most crucial question, namely *why* naturalness should serve as a normative instance.

It seems that arguments that consider enhancement technologies to be an assault on humanity, though they are intuitively plausible are nevertheless either unable to offer an acceptable notion of what this assault consists in and how the inherent value of humanness should be conceived of, or they can not be precise enough about the technologies they deem unacceptable. Both Habermas and Fukuyama speak in quite general terms about enhancement and make derogatory remarks about "wild fantasies" that motivate some "crazy" science-fiction scientists. Unfortunately, this level of generality in discussing transhumanist/posthumanist aspirations is insufficient especially when put against claims of such great dimensions as the threat of istrumentalization and dehumanization.

Polyvalent Human Nature

As we have seen the concept of human nature plays a crucial role especially in bioconservative lines of argumentation that seek to establish it as a source of normativity. Thus, human nature should serve the role of erecting a boundary that must not be crossed by technological, manipulative efforts. So far I have tried to argue that these attempts ultimately fail and result in a form of

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points. As Habermas writes, dignity is not a characteristic that one can possess but rather something that is negotiated in webs of interpersonal commitment. It will never "turn out" or be decided whether we truly possess those rights we attribute each other as inalienable human rights and this is not the decisive factor. In my view what seems to count is the act of attribution and with Richard Rorty I believe that there is no "objective knowledge" that can underlie morals, such as knowledge of "something" that makes us human and can thus serve as the foundation of obligations. It would probably serve us well to follow his advice and shift the focus of moral philosophy from a search for a rational foundation of morality and human rights, to the education of sentiments in order to expand the initially rather limited moral circle. There is no a priori reason why this circle could not include any kind of modified or enhanced being or why enhanced beings would not include the unenhanced. My own preference would lie with a system that avoided biologism and took relationality and the recognition of otherness in oneself as the cornerstones of moral philosophy. While I certainly recognize that such an approach would not necessarily solve the problem related to the moral status of embryos for example, I do believe that it is a more adequate starting point than ruminations over an essentialistically construed human nature. By rejecting Habermas's biologism but taking seriously his approach to relationality we could perhaps start a fruitful discussion of the question concerning the impact of biotechnological manipulations on this relationality. Certainly, one would have to be very precise in defining the technologies in question.

biological essentialism that is difficult if not impossible to maintain. However, human nature is a polyvalent term and it can be and has indeed been employed to argue for the opposite position as well, namely self-transformation. As Kurt Bayertz notes, as opposed to animals it is characteristic of human nature that it is not merely a product of evolution but is constantly changed by human action itself. In that sense it is "artificial by nature", which means that any attempt to discriminate natural and thus legitimate from artificial, that is illegitimate forms of manipulation must fail.[160,161] One might even say that it belongs to our nature to change our nature, which is an often repeated idea since the birth of humanism.

Also, ever since Aristotle famously defined man as a "rational animal" the relationship of the two concepts rationality and animality has been a central topic in the history of Western philosophy. As already noted in the first chapter, for Aristotle, striving for perfection was a defining element of all things and activities. Yet, he also thought of 'nature' as eternally fixed and human activities as parts of this nature that could bring about that what nature would by mimicking it. So the capacity of self-perfection that resides in humans is directed at unfolding that, which is inherent in human nature itself. It is this inherent *telos* that humans ought to bring about and because the differentia specifica of humans consists in their rationality or reason, perfection is importantly related to our contemplative faculty.

Later, especially in the 18th century a rather different relationship between nature and reason emerged that is most vividly evidenced by Kant's reformulation of Aristotle's definition. As we have already seen in the previous chapter man was no longer animal rationale but rather animal ration*abi*le. Here being human is understood as the task of unfolding reason and becoming that what we – in a sense – already are. Yet as David Heyd notes this task has to be understood as directed in some sense against nature, since that realm is determined and guided by laws whereas humans are characterized by freedom. The reasons Heyd gives for this are firstly an increasingly mechanistic and scientific understanding of nature and second a denaturalized understanding of reason as the uniquely human faculty and the seat of freedom. For example, Heyd quotes Rousseau, who was also a major inspiration for Kant.

> According to Rousseau, the philosophical basis for the polar distinction between ''the will'' and ''the senses'' lies in the fact that while ''physics explains in some way the mechanism of the senses and the formation of ideas,'' the power of free will or choice is found in ''purely spiritual acts about which the laws of mechanics explain nothing''[162]

The uniqueness of humans consists in them being – at least partly – free from natural determination

[160] Bayertz, K., Hat der Mensch eine Natur? Und ist sie wertvoll? in Weiss, M., G., (ed.) Bios und Zoë, Suhrkamp, Frankfurt am Main 2009. p. 204.

[161] Helmuth Plessner has also made the law of natural artificiality as the first principle of his philosophical anthropology.

[162] Rousseau, 1964, pp. 113–114 quoted in Heyd, D., Human Nature: An Oxymoron? Journal of Medicine and Philosophy, 2003, Vol. 28, No. 2, p. 153

in virtue of their transcendental reason.[163] So, the task of human perfectibility consists in unfolding human freedom and reason in opposition to the determined world of nature. A similar conflict takes shape in Kantian ethics in the form of the tension between animal-like natural inclinations and moral duty. This line of thought is a central source of reference for thinkers who argue that biotechnologies, by making nature malleable finally provide us with the means to rid ourselves from the shackles of determination and unfold freedom.

In the next sections I will discuss relevant techno-progressive authors who argue along similar lines and then I will try to show why using science to overcome nature and unfold human freedom ultimately results in an irresolvable paradox.

Destined for Redesign

At about the same time when Francis Fukuyama completed his book *Our Posthuman Future* Gregory Stock, the director of UCLA's Program on Medicine, Technology and Society also published his thoughts on our imminent technological self-transformation under the title *Redesigning Humans*. The two authors also went on a rather combative lecture tour to propagate their books and have often encountered one another in public discussions that embodied the polarized debate between proponents and opponents. In my view a rather striking difference between the two approaches is that Fukuyama attempts – however unsuccessfully – to provide reasoned arguments for his case and pleas for the use of legal and political means to take a different course. On the other hand Stock's book, which is filled with technical details and prospected paths of future development nicely illustrates what after Baylis and Roberts we can call the inevitability thesis. In their article *The Inevitability of Genetic Enhancement Technologies* Baylis and Roberts outline a number of arguments that speak against the use enhancement technologies. They list ones similar to those I have concerned under Habermas and Fukuyama, but also others like the problem of unjust distribution, cutting back on funding for other important research, further individualizing disease instead of focusing on social factors, etc. They conclude that

> There is no evidence as yet, however, that these arguments in particular, or any other arguments, *however well* developed, will suffice to stop the refinement and use of genetic enhancement technologies. As it happens, contemporary Western democracies have no experience with permanently halting the development and use of any enhancement technology on ethical grounds. [164]

[163] Heyd op. cit.
[164] Baylis, F., Jason, S., R., The Inevitability of Genetic Enhancement Technologies, Bioethics, Volume 18 Number 1 2004

The most crucial reason that Baylis and Roberts give for this likely trend is their assumption that „the essential characteristics of humanness are *perfectibility* and the biosocial drive to pursue perfection"[165] make it impossible to stop.

Gregory Stock uses a very similar rhetoric to argue for the inescapable arrival of enhancement. In particular he stresses two points. Firstly that enhancement technologies are inseparable from mainstream biomedical research supported by almost everyone. As he says:

> The coming possibilities will be the inadvertent spinoff of mainstream research that virtually everyone supports. Infertility, for example, is a source of deep pain for millions of couples. Researchers and clinicians working on in vitro fertilization (IVF) don't think much about the future of human evolution, but nonetheless are building a foundation of expertise in conceiving, handling, testing and implanting human embryos, and this will one day be the basis for the manipulation of the human species.[166]

In this respect his position is consistent, for he points out that all future reproductive technologies are predicated on the use of IVF, hence the relevant boundaries have already been crossed. Interestingly, he even admits and says out loud those conclusions that other authors either try to conceal or present in the form of a positive argument. Stock is very straightforward about stating the reasons most likely to drive enhancements.

> The possibility of altering the genes of our prospective children is not some isolated spinoff of molecular biology but an integral part of the advancing technologies that culminate a century of progress in the biological sciences. We have spent billions to unravel our biology, not out of idle curiosity, but in the hope of bettering our lives. We are not about to turn away from this.[167]

So he does not strike any utopian chords or indulge in wild fantasies but attempts to present the case of human enhancement as the logical and unavoidable consequence of modern science and biomedicine. Enhancement is a further expression of scientific progress and it is simply unimaginable and impossible that we *not* seize this opportunity; especially given the fact that we have made considerable financial investments.

It must be acknowledged that Stock has a valid point on the issue of continuity between mainstream research and enhancement. A number of current therapeutic developments and research projects under way can easily transform into enhancement. A simple example again is that of prosthetic limbs that over time as biomimetics and biomechanics progress are likely to become far superior to human extremities. Cochlear implants and aids for the seeing-impaired may also one day surpass the sensitivity of the human ear and eye. This striking conclusion is even true if we consider one of the most far-fetched visions of human augmentation, namely the uploading to or recreation of human consciousness in artificial systems. Current day applications in deep brain stimulation as well as research in the field of artificial neural networks are predicated on the assumption that

[165] Ibid. p. 25.
[166] Stock op cit. p. 5.
[167] Ibid p. 13.

conscious phenomena are the results of brain activity, which consists of neural mechanisms, that is: information processing. Once brain activity is seen in terms of information processing it can in principle be simulated in computer systems.[168] Already today there are massive research projects underway that want to create artificial versions of animal cortical columns[169] and many scientists are busy trying to create chip replacements of different brain regions. The first major breakthrough in this area came with the development of an artificial hippocampus, an area of the brain that plays an important role in the mediation of long-term memories.[170] These chips differ from earlier implants in that they don't merely stimulate the brain but replace the function of damaged tissues. This means that the idea of "consciousness in silicon" is a part of neuroscience and not an extrapolation of science fiction enthusiasts. Furthermore, it also means that enhancement is also an immanent possibility as computer systems are more easily modifiable than brain cells. Stock is also aware of these possibilities but on the issue of neural implants and brain-computer interfaces he is far more sober and committed to the complexities of flesh and tissues than some other visionaries, like Ray Kurzweil. Stock is more focused on using biotechnologies to prolong life and germ line technologies to eliminate disease and enhance humanity.

Besides claiming that enhancements will be spinoffs of mainstream research Stock's second interesting point is his belief that the inevitability of enhancements is due to our *inability* to do anything against them. So he radically downplays the relevance of all our possible instruments of influencing technological development.

> Our technology is evolving so rapidly that by the time we begin to adjust to one development, another is already surpassing it. The answer would seem to be to slow down and devise the best course in advance, but that notion is a mirage. Change is accelerating, not slowing, and even if we could agree on what to aim for, the goal would probably be unrealistic.[171]

So the crux of his argument is that it is impossible to do anything in advance. He seems to construe technological development as an autonomous system that has come to implicate the transformation of humans as well and it would be naïve to think that we can halt or control this process in any way. He rejects the possibility of global consensus on regulatory questions, considers the development to be too fast to keep up with and believes that any local regulation would only move application and research somewhere else. This understanding of technology as an autonomous system holds that in effect no one is in control and no one *can* be in control because of the immense complexities involved. On this view of technology, despite the fact the humans create the technology once it is

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[168] Bear, M., Connors, B., W., Paradiso, M., A., Neuroscience: Exploring the Brain, Lippincott Williams&Wilkins 2007.
[169] See the homepage of the Blue Brain Project at the École Polytechnique in Lausanne. http://bluebrain.epfl.ch/ Last retrieved 20 August 2010
[170] Graham-Rowe, D., World's first brain prosthesis revealed, New Scientist 12 March 2003. http://www.newscientist.com/article/dn3488-worlds-first-brain-prosthesis-revealed.html Last retrieved 20 August 2010
[171] Stock op. cit. p 11

available and extant it has a life of its own. Each actor, governing body or organization has insight into only a fragment of the entire process that develops independently.[172]

However, while Stock rejects the possibility of oversight and control he is nevertheless more specific about some of the forces he sees as driving the developments. These are consumer desire on the one hand and economic competition on the other. His favoured example evokes a kind of cultural clash between Western countries and China. Stock echoes the currently widespread predicament that China is probably on the ascendancy to become the next major global power.

> If the manipulation of human genetics seems a necessary step along that path, Western sensitivities and policies are unlikely to stand in the way. And once a single major nation embraces so foundational a development as this, others would soon have to follow, however reluctantly, to avoid being left behind.[173]

Here again, Stock may have a point as it is a well studied phenomenon that Chinese population policy since the 1970s has heralded the twin goal of reducing quantity while increasing quality and they have not refrained from eugenic counselling practices that would be unimaginable in the West today.[174] The Chinese approach has even been dubbed "authoritarian Transhumanism."[175] However, the philosophically relevant issue is not whether Stock is right in his predictions and justified in lumping "the West" in one bloc and pitting it against "China", but rather that he considers technology to be completely beyond human control and shaped by economic competition.

But Stock's position is far more intriguing, or should I say confusing than this. Towards the end of his book he strikes a different tone that echoes many of the utopian disciples of enhancement I have discussed in the first chapter. Here, his view of man is that of a creature constantly remaking itself. For Stock our journey of self-transformation is not merely a physical but also a deeply spiritual endeavour. Our time is a historic time of transition; one in which we may „be able to transform ourselves into something „other"."[176] Rejecting this magnificent opportunity would in his view be tantamount to denying our essential nature and probably failing our destiny.

> Ultimately, such a retreat might deaden the human spirit of exploration, taming and diminishing us. […] Exploring human biology and facing the truths we uncover in the process will be the most gripping adventure in all our history, and it has already begun. What emerges from this penetration into our inner space will change us all[177]

There are many striking features to this depiction. For one, the use of the word „tame" is interesting if we contrast it with that of Sloterdijk who thought of humanism and, in a provocative manner,

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[172] Dusek, V., Philosophy of Technology, Blackwell Publishing 2006. pp. 105-110.
[173] Stock op. cit. p. 164.
[174] See for example Greenhalgh, S., Winckler, E., Governing China's Population, Stanford University Press, Stanford, 2003.
[175] Hughes J., quoted in European Technology Assessment Group, Technology Asssessment on Converging Technologies, 2006. p 82. http://www.europarl.europa.eu/stoa/publications/studies/stoa183_en.pdf Last retrieved 20 August 2010
[176] Stock op. cit. p170.
[177] Ibid.

biotechnologies as taming the bestiality and barbarism inherent to human nature. As opposed to this Stock sees human nature as essentially curious, explorative and ready for adventure such that uncovering the mysteries of human biology is likened to a great exploration where we face countless dangers but eventually emerge triumphant, assured in the comforting feeling that we have overcome yet another barrier. He often reverts to images of this kind comparing biotechnological research to previous exploratory adventures. It would thus be a crippling of human nature not to *penetrate* into its own core. This is also a rather peculiar image that immediately calls to mind Francis Bacon's famous lines about the nature of scientific research.

> But if any man there be who, not content to rest in and use the knowledge which has already been discovered, aspires to penetrate further; to overcome, not an adversary in argument, but nature in action; to seek, not pretty and probable conjectures, but certain and demonstrable knowledge;—I invite all such to join themselves, as true sons of knowledge, with me, that passing by the outer courts of nature, which numbers have trodden, we may find a way at length into her inner chambers[178]

The masculinist orientation of science and the identification of nature with a woman who has to be conquered has been a prominent topic in the feminist critique of science. Sandra Harding has argued for example that such metaphors are not merely formal elements of scientific reasoning that serve the psychological function of making communication easier without affecting the theory. Rather such metaphors of dominating women are constitutive elements of the theory and can only be explanatory because they depict some shared aspect in the interpersonal world. Such metaphors feed upon and strengthen the hierarchical relationship between men and women.[179] Of course, reproductive technologies are highly ambivalent and bear great liberatory potential especially for women, but Stock's use of the notion of „penetration" in relation to reprogenetics is still somewhat perplexing.

Penetrating into our inner space is curious for another reason. It suggests that we can almost take an external position in relation to „who we really are" – which is understood in biological terms – and behold it as an object. Almost as if *we* were somehow different from that what we behold as ourselves. Who we really are, our humanness thus becomes *our* object of study and manipulation. However, Stock is quite ambiguous on this issue as he also stresses that we will necessarily change so it might be hasty about drawing conclusions.

> [Redesigning ourselves] is neither an invasion of the inhuman, threatening that which is human within us, nor a transcendence of our human limits. Remaking ourselves is the ultimate expression and realization of our humanity. […] Adaptable as we are, to remain at home in the world we are forming, we will have to adjust ourselves to cope with it.[180]

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[178] Francis Bacon quoted in Hattaway, M., Bacon and "Knowledge Broken": Limits for Scientific Method, Journal of the History of Ideas, Vol. 39, No. 2 1978 p. 193.
[179] Harding, S., 1986, The Science Question in Feminism, Milton Keynes, Open University Press
[180] Stock op. cit. p. 198.

Despite the fact that he explicitly rejects the view that we shall transcend human limitations he believes that once sophisticated technologies are available most people will not want to remain "natural" and that those who do shall become the likes of "relics from an abandoned human past."[181]

Until we get there we should employ market mechanisms and above all try to keep governmental interventions out of the business of germinal choice. As Stock says, we should fear totalitarianism, nationalism and government, and not enhancement technologies. Thus his position is a strange mixture of technological determinism, market triumphalism and an understanding of human nature as essentially characterized by the desire to overcome itself. I now turn to a discussion of Nick Bostrom and transhumanism more closely to illustrate an even more radicalized stance and the position furthest away from bioconservative authors.

From Enhancement to Posthumanity

I have already briefly introduced Nick Bostrom at the end of the first chapter. He is currently Professor of philosophy at Oxford University and Head of the Future of Humanity Institute. His work has greatly contributed to transhumanism becoming a respected or at least unavoidable position in relevant debates. He also belongs to the founders of institutionalized transhumanism.

The two concepts transhumanism/posthumanism are sometimes used interchangeably though they can have very divergent meanings. For the moment I can say that transhumanism – as mentioned in Chapter One – is the belief that humanity currently represents a transitory stage in the evolutionary process and that we can and should use technologies to hasten our development.[182] The term posthuman is closely linked to this idea as some transhumanists hold that technological progress will enable a step change beyond humanity that is going to be so profound as to move us beyond the current form of the human altogether, in a very literal sense.

Besides "promoting rational thinking, freedom, tolerance, democracy, and concern for our fellow human beings"[183] the central occupation of transhumanism is to encourage the application of technology in order to transcend our current limitations. The aim is to achieve technological mastery over our own nature thereby attaining a post-human state of existence. This would consist in possessing "intellectual heights as far above any current human genius as humans are above other

[181] Ibid. 199.
[182] Bostrom, N., 'The Transhumanist FAQ', World Transhumanist Association, October 2003, http://www.transhumanism.org/resources/faq.html Last retrieved 20 August 2010
[183] Ibid.

primates."[184] Posthumans would be

> [r]esistant to disease and impervious to aging [they would have] unlimited youth and vigor [and could] exercise control over their own desires, moods, and mental states [as well as] be able to avoid feeling tired, hateful, or irritated about petty things.[185]

There are many paths that might take us to posthumanity and Bostrom has published intensely on almost all of them. Just as Gregory Stock he also subscribes to the idea that all our projected enhancements are in perfect accord with currently held scientific views about the nature of the universe.

Bostrom, along with other transhumanists considers death itself to be the most severe limitation of human flourishing. In his popular *Fable of the Dragon Tyrant* Bostrom likens death to an eternally hungry monster to whom a human city has to make grave sacrifices every year until their ruler is finally convinced to construct a powerful weapon to kill the beast.[186] Bostrom uses the context of the fable to ridicule bioconservative positions that argue against life extension.

> Spiritual men sought to comfort those who were afraid of being eaten by the dragon (which included almost everyone, although many denied it in public) by promising another life after death, a life that would be free from the dragon-scourge. Other orators argued that the dragon has its place in the natural order and a moral right to be fed. They said that it was part of the very meaning of being human to end up in the dragon's stomach. Others still maintained that the dragon was good for the human species because it kept the population size down. To what extent these arguments convinced the worried souls is not known. Most people tried to cope by not thinking about the grim end that awaited them.[187]

This argument suggests that we do should do everything in our power to fend off death, and concentrate our efforts at scientific research that would specifically aim at life extension. One such researcher who is active in the field of biogerontology and fights a rather lonely crusade for funding for life extension is Cambridge scientist Aubrey de Grey. In his words

> Aging of the body, just like aging of a car or a house, is merely a maintenance problem. And of course, we have hundred-year-old cars and […] thousand-year-old buildings still functioning as well as when they were built […] At the very least, the precedent of cars and houses gives cause for cautious optimism that aging can be postponed indefinitely by sufficiently thorough and frequent maintenance.[188]

Of course, de Grey adds that this is likely to take extremely long as the complexities and unforeseen difficulties involved can not be compared to those related to a vintage car. But he sticks to the principle and in conclusion of his book states that the important thing is the gradual postponement of death. He calls this *longevity escape velocity*, which is the „threshold rate of biomedical progress

[184] Ibid.
[185] Ibid.
[186] Bostrom, N., The Fable of the Dragon Tyrant, Journal of Medical Ethics, 2005, Vol. 31, No. 5, pp 273-277
[187] Ibid.
[188] de Grey, A., Ending Aging, St. Martin's Press, New York, 2007. p.21.

that will allow us to stave off aging indefinitely".[189] The idea is that we would always have to live just a bit longer, so that we are still in time for the next life extension breakthrough.

It is truly remarkable that transhumanists in the early 21st century are articulating visions that almost literally resemble those of Russian Biocosmists from a century ago. Yet there are also crucial differences. Whereas Biocosmists saw their project as a part of a broad undertaking to remedy the injustice of temporal limitations and guarantee that all human beings could share in the coming communist society, current transhumanists want personal immortality simply to stay young, healthy and beautiful forever. Their definition of the posthuman also echoes a commitment to this ideal of a life without any form of constraint, hindrance or conflict and a devotion to a battle against the ephemeral nature of life. „Perhaps an extreme reflection of the California desire to remain forever young in the sun"[190] Also, immortality is no longer the business of states but of individuals and companies specialised in providing life extension services.

Another especially important topic is the development of information technologies, which in one sense are the catalysts of progress in other domains as well. Transhumanists often make reference to a trend observed by Gordon Moore, a former chairman of the world's largest microchip manufacturing company Intel. Moore observed in the 1970s that the number of integrated circuits on computer chips doubled about every two years, leading to an exponential increase in processing speed. The trend itself has now accelerated and doubling time is about 18 month. The way the average person encounters this trend is that computers keep getting smaller and smaller with their performance increasing while their price remains more or less constant. This has come to be known as Moore's Law.[191] Even though it is at best a trend transhumanists refer to it as a rock-solid fact and base their predictions and assumptions on the continued validity of Moore's Law. If it holds true artificial intelligence is expected to achieve magnificent levels in the coming years. Some critics would remark, that AI promises have already skyrocketed during the 60s when human level computers and HAL-9000 were "just around the corner".

Despite scepticism from a number of circles some prominent researchers still stick to the idea of creating artificial general intelligence[192] even though the approach may have shifted from a simple representationalist view of cognition that considered linguistic competence as the hallmark of intelligence to a different conception.[193] Thus transhumanists still count with the possibility that sophisticated robots will one day pass an extended version of the Turing-Test that not only includes the ability to lead an intelligent conversation but also every other form of interaction with the world.

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[189] Ibid. p. 371.
[190] Winner, L., Resistance is Futile, in Baillie, H., W., casey, T., K., (eds.) Is Human Nature Obsolete? MIT Press, 2005.p. 392.
[191] Kurzweil, R. The Singularity is Near, Penguin Books, 2005. p. 55.
[192] See for example: Goertzel, B., Pennachin, C., (eds.) Artificial General Intelligence, Springer 2007.
[193] See for example Varela, F., Kognitionswissenschaft-Kognitionstechnik, Suhrkamp Verlag, 1990.

This prospect involves complex philosophical issues such as the problem of "grounding". That is: even if complex motor and sensory capabilities are solved how is it that the artificial system comes to generate "meaning"? What will ground the meaning of symbols in a computer/robot to the world?[194] In general transhumanists ultimately revert to the tactic of "eventually", meaning that they delegate the solution of complex conceptual problems to technological advancement and increase in complexity.[195] Hence, one way of creating posthuman entities leads through AI and involves completely artificial beings. As a result the question of the legal and moral status of such beings is an intensely debated topic among transhumanis.[196]

With the advancement of computer science in tandem with neuroscience it might also become possible to upload human consciousness into computer systems and achieve cyber-immortality. Once individual human identity is preserved – so the argument goes – we can live eternal lives and transfer ourselves into various different substrates, such as advanced robotic bodies. The feasibility of this procedure is one of the most highly discussed issues within the transhumanist community. The prospect of this form of transcending biology is linked to the question of the multiple realizability of conscious states. This issue had been introduced by the functionalist philosophy of mind of Hilary Putnam in the 1960s.[197] I have already stated earlier that multiple realizability – which essentially treats the mind as a software and the brain, computer or other physical substrate as the hardware – is to some extent inherent in contemporary neuroscience, as evidenced by reverse-engineering and modelling attempts. However, multiple realizability and the question of copying an individual's mind are different issues because the process of reading the brain and "setting it to motion" in a different environment are both conceptually and technologically unresolved issues and we only have educated guesses at the moment.[198]

Nanotechnology also plays a key role and has found its way into visions of human enhancement. Ray Kurzweil often describes a scenario in which hordes of nano-scale robots travel through the human body healing cells and linking directly to our nervous system. In this scenario the man-machine merger is literally complete, since perception, action and vital functions are all mediated through the technological system provided by nano-bots. For Kurzweil, this technology also represents a possible path towards life in fully immersive virtual environments. In his vision, we could switch between different virtual locations and our actual physical one, overlay many on top of each other anytime and change our personae from site to site thus experimenting with

[194] See for example: Clark, A., Being There: Putting Brain, Body, and World Together Again, MIT Press, 1998.
[195] See for example Kurzweil, The Age of Spiritual Machines, Penguin Books, 1999.
[196] See for example Hughes, J., Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future, Westview Press, Cambridge, MA, 2004
[197] See Putnam, H., 'Psychological Predicates', in Capitan, W., H., Merrill, D., D., (eds.), Art, Mind, and Religion, University of Pittsburgh Press, Pittsburgh , 1967, pp. 37-48.
[198] Anders, Sandberg; Nick, Boström (2008). *Whole Brain Emulation: A Roadmap*. Technical Report #2008‐3. Future of Humanity Institute, Oxford University. http://www.fhi.ox.ac.uk/Reports/2008-3.pdf Retrieved 21. August 2010

different embodiments.[199]

Besides unquestioned faith in the progress of science and technology these visions share an idea of the human as the shaper of its own future development. Transhumanists echo earlier notions of participant evolution and seem to have a teleological understanding of the evolution of intelligence that necessarily involves moving on to the next stage of development.[200] In this sense we have to understand the *post* in posthumanism in the very literal sense that our own actions and interventions into our evolution eventually bring about our own disappearance. In the succinct formulation of Marvin Minsky, one of the great legends of artificial intelligence:

> Will robots inherit the earth? Yes, but they will be our children. We owe our minds to the deaths and lives of all the creatures that were ever engaged in the struggle called Evolution. Our job is to see that all this work shall not end up in meaningless waste.[201]

Thus our duty is to advance to arrival of more sophisticated beings who will owe their existence to us but shall no longer be constrained by that factors that limited humans. Yet, there is also a strange form of continuity posited. As Bostrom says transhumanism holds that

> [c]urrent human nature is improvable through the use of applied science and other rational methods, which may make it possible to increase human health-span, extend our intellectual and physical capacities, and give us increased *control over our own mental states and moods*.[202]

In some strange sense *we* will be in control of the posthuman being we ourselves are about to become. As Ian Hacking argues thinkers in the cyborg tradition ever since Clynes and Kline who have proclaimed technological mastery over the body can be seen as radical dualists. This view considers the biological body to be the original prosthesis that could be altered and amended without in any way affecting the *human essence*, which seems to consist mainly in freedom and in the delights of an unconstrained mind.[203] When reading such contemporary transhumanists as Ray Kurzweil or William Sims Bainbridge, one can not escape the impression that a strong dualism is indeed characteristic of their thinking. According to Kurzweil, progress in nanotechnology will enable us to replace a host of our organs such as the gastrointestinal system, the heart, the lungs, etc., with artificial ones of increased functionality. As he claims, "ultimately we will become more nonbiological than biological."[204] We can even change our brains to better performing ones in order

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[199] Kurzweil, R. The Singularity is Near, Penguin Books, 2005.

[200] Coenen, C., Der posthumanistische Technofuturismus in den Debatten über Nanotechnologie und Converging Technologies, in Nordmann, A., Schummer, J., Schwarz, A.,Nanotechnologien im Kontext, Akademische Verlagsgesellschaft 2006.

[201] Minsky, M., Will Robots Inherit the Earth? Scientific American, Oct, 1994. http://web.media.mit.edu/~minsky/papers/sciam.inherit.html Last retrieved 20 August 2010.

[202] Bostrom, N., 'In Defense of Posthuman Dignity', Nick Bostrom's Home Page, Last retrieved 21 August 2010. http://www.nickbostrom.com/ethics/dignity.html Italics are mine.

[203] Hacking, I., 'Körperteile groß und klein', Steiner, T.,(ed.) Genpool: Biopolitik und Körper-Utopien, Passagen Verlag Wien, 2002.

[204] Kurzweil, R., 'Human Body Version 2.0' in Scientific Conquest of Death: Essays on Infinite Lifespans,

to keep up with the immensely rapid technological change around us. Thus, in accord with the original meaning of the term "cyborg" we are about to modify ourselves in order to better suit our technologically transformed environment. This time, it is not space travel but the world we have created for ourselves, but does not necessarily seem hospitable anymore. As authors like Kurzweil or Bainbridge argue eventually and seemingly inevitably humans shall become *more than human*, transcending biology altogether. The vulnerable, imperfect and temporally limited nature of bodily existence in itself constitutes a form of deficiency, which may be overcome by submitting the body to rational control. In transhumanism the body is considered to be merely an accidental, original prosthesis that can be freely transformed and amended, whereas the mind is taken to be essential and ultimately dissociable from its material base in the form of information patterns. This postbiological, posthuman "life"-form that is no longer bound by "flesh" is often described with metaphors like,

> [t]he transition from flesh to data will not be so much metamorphosis as liberation […] When we emerge into cyberspace, we should no more lament the loss of the bodies that we leave behind than an eagle hatchling laments the shattered fragments of its egg when it first takes wing.[205]

Hence, the ultimate realization of human potentials would be to shed the current form of human existence entirely. Yet, this would not be metamorphosis, but liberation. It would finally signal the moment when humans are free. I believe this emancipatory aspiration is the very core of transhumanist thought. I also believe that this image is deeply flawed and wrought with paradox. In the next chapter I will present an argument as to why I believe this is so and look for different possibilities of thinking posthumanism.

The 'Schizophrenic' Nature of the Posthuman

As we have seen, for transhumanists the ultimate realization of human potentials would be to shed our current form of existence entirely. This seems to confirm that transhumanists who embrace this possibility subscribe to a dualistic logic. Ultimate mastery over the limiting world of the flesh is finally achieved when the mind can sever its' biological bonds. Thus, a disembodied notion of conscious agency is avowed. According to Katherine Hayles, as the mind is hypothetically divorced from the body and dissolved in patterns of information that can travel freely between different substrates, the potentially liberatory effects of technology are subsumed under the classical mind/body dualism. For Hayles transhumanism in this respect seems to be heir to a liberal humanist understanding of the subject that perceives the mind to be essential, while the body merely

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LibrosEnRed, Buenos Aires, 2004, p. 103.

[205] Kurzweil op. cit. p. 119.

accidental. Yet, as Hayles eloquently argued, cyborgization is not a means to extend liberal humanism – it seems rather to subvert and undermine it. According to her,

> [c]onscious agency has never been "in control." [...] Mastery through the exercise of autonomous will is merely the story consciousness tells itself to explain results that actually come about through chaotic dynamics and emergent structures. If […] there is a relation among the desire for mastery, an objectivist account of science, and the imperialist project of subduing nature, then the posthuman offers resources for the construction of another kind of account.[206]

For Hayles then, the posthuman offers a perspective beyond the traditional dichotomies of classical humanism, regardless of whether actual technological manipulations have been made on the body. This is a radically different sense of posthumanism. As we can see, a fundamental characteristic of this understanding is a shift in the conceptualization of subjectivity, away from the notion of a controlling disembodied unitary agency. Nonetheless, transhumanism seems to be immune to this understanding. So much so, that a foundational text of the movement explicitly states, that the belief in achieving posthumanity simply due to shifts in our self-understanding is a "confusion or corruption of the original meaning of the term."[207] Changing some aspects of our self-conception will not suffice, for true posthumanity is achievable only by radically modifying our brains and bodies.

Yet, an unintended consequence of the destabilization of solid categories and the dissolution of human nature as a constant given, which is provoked by cyborg technologies is precisely that classical dualist conceptions become untenable.[208] Even everyday practices of biotechnology demonstrate clearly that the idea a subject gaining control over objective nature is illusory, for such interventions are never aimed merely at a body, but constitute the manipulation of an entire human being. In light of this, statements from transhumanist authors about our increasing ability to control our own nature and the interpretation of this ability as the true unfolding of human potentials, mastery and freedom seems to be somewhat self-contradictory. This contradiction lies in the fact that the very essence that is presumed to be liberated, namely subjectivity – which transhumanists equate with the mind and intelligence – is itself naturalized and becomes part of the realm of manipulable entities. Technological mastery over our own nature presupposes the existence of something beyond the technologically manipulable, yet, the condition of possibility for presupposing that is dissolved by technological naturalization itself. There is no one to take wings and leave the shackles of the egg behind, because the supposed external controller of the processes

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[206] Hayles, K., N., How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics, University of Chicago Press, Chicago, 1999, p. 288

[207] Bostrom, N., op. cit.

[208] Weiss, M., G., The Body of Phenomenology; Unforeseen Phenomenological Outcomes of Biotechnologies, The New School of Social Research, The Husserl Archives in Memory of Alfred Schütz, On The Future of Husserlian Phenomenology, http://newschool.edu/nssr/husserl/Future/Part%20Two/Weiss.html Last retrieved 20 August 2010

of transformation is also implicated in the change.

The vision of humanity emerging from transhumanist prophecies is thus a rather peculiar one. On the one hand, posthumans are free and liberated entities, complete masters of themselves who thus enjoy an unbounded subjectivity. On the other hand, they are utterly transparent in the sense that they are open to technological manipulation up to the minutest detail. Following Louis Sass I would like to interpret this vision in terms of a "schizophrenic" duality. In the section on the polyvalence of human nature I have already discussed the important shift in the understanding of nature and reason that had taken place during the 18th century in the philosophies of Kant, Rousseau and others that involved the denaturalization of reason. This means that the most essential human characteristic, namely reason – in order to save it from the deterministic realm of nature and ensure the freedom of will – was conceptualized in transcendental, non-natural terms. At the same time the only source of meaning, structure and order in the world was also perceived to be human reason. According to Foucault Kantian philosophy introduced a new kind of reflexivity by virtue of which reason, the mind or subjectivity became simultaneously the prime object of inquiry and the inquirer as well. In *The Order of Things* Foucault discusses the episteme or 'mode of thought' characteristic of modernity. According to him modernity gave rise to an understanding of man as an empirico-transcendental doublet, in the sense that the condition of knowledge became the object of empirical, rational study while it also served and was upheld as a transcendental foundation.[209] The situation of the mind contemplating itself, its' nature and origins is indeed a somewhat paradoxical constellation. The precondition of knowledge studies itself as given to itself in the form of an object. Foucault traced the birth of this doublet to Kantian philosophy, which stressed the constitutive role of subjectivity and the mind in forming the world of phenomena. On the other hand, the fact that Kant identified concrete categories by which the mind shaped the world of experience culminated in the scientific study of the mind, accompanied by naturalistic notions. As a result, the mind had been gradually transformed into a mere object among other objects, and as a natural entity it became amenable to manipulation. It served as the precondition of knowledge and at the same time an object of study and intervention; the quasi-omnipotent knower and the calculable known.

Psychologist Louis Sass takes this doublet as the basis of providing an interesting phenomenological interpretation of schizophrenia. As he says

> There is a strange duality lodged at the heart of the schizophrenic condition. On the one hand, such patients tend to lose their sense of active intentionality and integrated selfhood. Instead of serving as a kind of anchoring centre, the self may be dispersed outward, where it fragments into parts that float among the things of the world; even one's most intimate thoughts and inclinations may appear to emanate from some external source or mysterious

[209] Foucault, M., The Order of Things, Routledge, 2004. p. 347.

> foreign soul—as if they were 'the workings of another psyche' […] On the other hand, the patient's own consciousness can come to seem pre-eminent and all-powerful: one's own consciousness may seem poised at the controlling centre of the universe, with everything arrayed about it as around some constituting solipsistic deity.[210]

Sass does not intend to give an account of the aetiology of schizophrenia but rather wants to grasp the nature of the experience. Drawing on psychiatric accounts of the disease since it was first described as well as literary depictions Sass establishes a link between the phenomenology of schizophrenia and the doublet of modernity described by Foucault. As a side note I want to mention the peculiarity of the fact that according to some theories of this highly ambiguous disease, schizophrenia was first described in 1800 which puts Sass's analogy in an interesting light.[211] For him, both the schizophrenic experience and modern thought consist in "a characteristic veering between a bracing sense of absolute epistemic omnipotence, omniscience and freedom; and an equally compelling experience of the self as limited, determined and blind."[212] In effect it is a tension between competing yet simultaneously present interpretations of oneself as a limited and determined object that is scientifically knowable on the one hand whilst also being the sole source of knowledge, experience and meaning.

> Such patients claim to have a nearly divine intelligence yet to be incomparably stupid; to have limitless powers yet to be completely impotent; to be God himself yet to be nothing more than the beeping of a computer that was programmed during their sleep[213]

> [a] schizophrenic person is as liable to identify himself with god as with a machine, perhaps the most emblematic delusion of this enigmatic illness is of being a sort of *God-machine*, a kind of all-seeing, all-constituting camera eye.[214]

I believe it is this very duality that is manifest in the visions of technologically enabled posthumans. In exactly the same manner do posthumans seem to be God-machines – free and omnipotent entities that are at the same time entirely transparent and manipulable. My first impression upon reading these lines from Sass was that such an experience must be like a condensed and mind-blowing state of actually *living* the unbearable tensions implicated by naturalization as it crushes against our self-perception as autonomous beings who are in some sense distinct from everything science can describe; as the knowledge of the fact of being objectively describable and know-able hits upon our sense of subjectivity. Much akin to scenes from science fiction films like *Blade Runner* or *Ghost in the Shell*, were figures contemplate whether they are actually real or merely made, whether it can be known and most importantly whether it matters.

What, if any conclusion can be drawn from this analogy?

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[210] Sass, L., A., 'Schizophrenia, Self-Consciousness and the Modern Mind', in Models of the Self, Gallagher, S., Shear, J., (eds.) Imprint Academic, Exeter, 1999, p. 543.
[211] Shorter, E., A History of Psychiatry, John Wiley & Sons, 1997. p. 62
[212] Sass, op. cit. p. 541
[213] Ibid. p 545
[214] Ibid. p. 544. Italics are mine.

If the transhumanist discourse of radical emancipation and liberation by technologically subduing nature results in a paradoxical figure that is both omnipotent and impotent then we might as well follow Hayles' suggestion and search for a different notion of posthumanism. In order to resolve the above tension we might try to look for accounts that construe the relationship between subject and object differently, so that the mind, will or autonomous subject are not separated from the object; where the distinctions and dichotomies of nature and culture, artificial and organic, human and non-human collapse. For such an understanding I now turn to Donna Haraway's concept of the cyborg and Katherine Hayles' interpretation of the posthuman.

Ambiguity and Co-Evolution, Cyborgs and Posthumans

Contemporary philosophy of science as well as the social study of science offer possibilities and perspectives that go beyond those essentialist notions that even today greatly inform both bioconservative and technoprogressive thinkers in the debate over enhancements and human nature. Interestingly, the two terms *cyborg* and *posthuman* that are so crucial in the debate I have briefly introduced so far also have fundamentally different interpretations.

In her pathmaking essay from 1985 *A Manifesto for Cyborgs* Donna Haraway creatively appropriated the term *cyborg* and elaborated an understanding that is way beyond its original meaning. If we recall, the cyborg was a term coined by scientists Manfred Clynes and Nathan Kline who were researching the possibilities of adapting human physiology for space travel by creating feedback loops between organic and artificial systems. Clynes and Kline, as I have already mentioned understood the breaching of boundaries between organic and artificial systems that is implicated by this research at a merely technological, even technocratic level. Haraway took the concept of the cyborg and theorized it not merely as an artefact of technoscience but as something that in a sense grasps the human condition in late 20th century. In her famous formulation

> By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are all cyborgs. The cyborg is our ontology; it gives us our politics.[215]

At the heart of Haraway's notion of the cyborg is the idea that the boundaries that Western thinking has relied on for so long, such as between the organic and the artificial, the human and the animal, and between the physical and the non-physical are progressively breached by technoscience. Whereas the focus of philosophy has always been on that what separated us from animals and machines these distinctions and pure categories that have hitherto been deemed so constitutive of our self-understanding are now increasingly blurred, fleeting and indefinable. The idea of the

[215] Haraway, D., A Cyborg Manifesto, in Haraway, D., Simians, Cyborgs, and Women: The Reinvention of Nature, Routledge, 1990., pp. 149-183.

"human" as a category of beings that can *clare et distincte* be separated from the web of other entities is an illusion. A part of the title of a later interview with Haraway that paraphrases Bruno Latour – *We Have Never Been Modern* – brings the point home in an especially succinct manner: "We have never been human"[216], meaning that we have never been that autonomous, pure and ontologically closed entity we took ourselves to be.

Haraway also reflects on the history of the cyborg in the sense that she recognizes it as a product of militant capitalism, the space race and wartime frenzy in which the paradigm of Mutually Assured Destruction loomed high. She tries to divorce the cyborg from this cloud of meanings and truly *appropriates* the term. In accord with the manifesto-nature of the text she calls for a different understanding so that

> a cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints.[217]

So the cyborg is about embracing plurality, fracture, ambiguity and fluid boundaries not just in the realm of the social but straight to the level of our biology. Even though this previous sentence of mine was very un-cyborgian because of treating so distinctly and hierarchically social and other levels, when Haraway's crucial point is that nature and culture are only separable as the result of an act of division but they are not separate. In order to better express this she later introduced the term *naturecultures*.[218] Naturecultures is also about the cohabitation and co-evolution of humans with machines and animals yet it already slightly signals her move away from the cyborg and into what she came to call *companion species* and then dog studies. For Haraway, the cyborg was a historically situated figure that had a specific purpose, namely to think about the possibility of critique and the future of feminism in the emerging regime of informatics and the rearranging landscape of technoscience and the transformation of capitalism under the Reagan Star Wars era.

> I am very concerned that the term 'cyborg' be used specifically to refer to those kinds of entities that became historically possible around World War II and just after. The cyborg is intimately involved in specific histories of militarization, of specific research projects with ties to psychiatry and communications theory, behavioral research and psychopharmacological research, theories of information and information processing. It is essential that the cyborg is seen to emerge out of such a specific matrix.[219]

For Haraway the term "cyborg" has by now lost its critical potential. Hers was a call to use this militaristic being to demonstrate everything it was not intended for and to inhabit "more livable worlds". The cyborg was contaminated to the core and part of its purpose was precisely to challenge

[216] Gane, N., When We Have Never Been Human, What Is to Be Done?: Interview with Donna Haraway, Theory Culture Society 2006; 23; 135, pp. 135-158
[217] Haraway, D., op. cit. p. 151
[218] Haraway, D., Simians, Cyborgs, and Women: The Reinvention of Nature, Routledge, 1990.
[219] Haraway with Goodeve 2000: 129

purity and unquestionably origins. By now, Haraway has "come to see cyborgs as junior siblings in the much bigger, queer family of companion species".[220]

Yet, the cyborg has taken on a life of its own and even developed its own „field" of cyborgology.[221] While it has received countless interpretations in one important and perhaps even widespread sense the cyborg has come to stand for the idea that humans and technology are co-constitutive thereby questioning classic dichotomies. It is in this – admittedly curbed and simplified – sense that I am using it as well.

Another figure, partly owing its existence to Haraway's cyborg is the *posthuman*. Though this term has also already surfaced quite often, it has always assumed the meaning of a technologically enabled stage of human evolution where current Homo sapiens is superseded by vastly more improved beings. This is the transhumanist version of the story that ultimately culminates in the vision of disembodied minds merging and surging in cyberspace. For Haraway this represents "blissed-out techno-idiocy"[222] from which she certainly distances herself on all occasions.

In her highly influential book *How We Became Posthuman* N. Katherine Hayles provided a critical reading of the history of cybernetics from its inception up to current day research in robotics and artificial life in order to explicate a different understanding of the posthuman. She was largely motivated by her consternation over the notion of uploading consciousness that is so central to transhumanism. She begins her story in the 1940s and '50s when a group of scientists, such as Norbert Wiener, Warren McCulloch and Claude Shannon, regularly held meetings which later came to be known as the Macy Conferences. The aim of these gatherings was to create a model of communication and control that would be equally applicable to animals, humans and machines. Central to this general theory were the concepts of the feedback loop between the system and its environment, and that of information. Information came to be defined as a *bodiless* entity, extracted from its material base, which can travel freely through different substrates.

> Shannon's theory defines information as a probability function with no dimensions, no materiality, and no necessary connection with meaning. It is a pattern, not a presence… The very definition of information, then, encodes the distinction between materiality and information that was also becoming important in molecular biology during this period.[223]

Hayles is careful to note that Shannon considered his theory to be a description of how messages can be transmitted in an effective manner, and not a general theory of "meaning". However, coupled with McCulloch's neural networks and von Neumann's work on computers, the concept of information has given rise to a way looking at all systems, including humans as essentially

[220] Haraway, D., The Comanion Species Manifesto, Prickley Paradigm Press, 2003., p. 11.
[221] See for example the collection of "cyborg scholar" Chris Hables Gray at http://www.chrishablesgray.org/CyborgCitizen/cyborgology.html Last retrieved 20 August 2010
[222] Gane, N., op. cit. p. 146.
[223] Hayles op. cit. p. 18.

information processing entities. The decontextualizing move that lies at the heart of the concept of information – as it treats information out of context and divorced from meaning – was a perfectly legitimate step in the context of defining the theory. However, as she argues, taken out of context it gave rise to the idea that information can travel freely between different kinds of material substrates. It is this double-decontextualization, elevating an element of the theory to a generalized claim that she critiques.

> Thus, a simplification necessitated by engineering considerations becomes an ideology in which a reified concept of information is treated as if it were fully commensurate with the complexities of human thought.[224]

Hayles' book is thus in a sense an attempt to deconstruct this ideology in order to treat information at its proper place. For Hayles the posthuman is thus not, or should not be the continuation of classical humanism but signals the end of it. As she says:

> If my nightmare is a culture inhabited by posthumans who regard their bodies as fashion accessories rather than the ground of being, my dream is a version of the posthuman that embraces the possibilities of information technologies without being seduced by fantasies of unlimited power and disembodied immortality, that recognizes and celebrates finitude as a condition of human being, and that understands human life is embedded in a material world of great complexity, one on which we depend for our continued survival.

Thus both Haraway and Hayles attempt to overcome classic dichotomies in the direction of situatedness and embodiment.

When reading these lines carefully it must have occurred that I have – perhaps not even very subtly – changed the focus of inquiry. Whereas the issue of enhancement by mainly biotechnological means was foregrounded earlier, this chapter has mostly discussed cybernetics, information and computer science. I want to quickly explain this detour. The reason is simply that both of these concepts, the cyborg and the posthuman stress the consequences of cybernetics and information technologies more than biology. Yet if we understand them as perspectives beyond the nature/culture, subject/object divide they offer a way of looking at enhancements or the man-technology merger more generally from a different vantage point; namely, from that of co-constitution and relationality. From this perspective it becomes clear that technologies neither intrude upon us and violate originary purity, nor allow us to bend nature according to our own will. So if our relationship to technology is characterized by deep ambiguity, if it is not, in Haraway's words "either/or" but rather "neither/both" then we may start to rethink the questions concerning enhancement as well. What kind of an image confronts us once we construe technology as something that constantly shapes how we think about ourselves and indeed that what we are?

Both Haraway's cyborg and Hayles' posthuman entailed a very strong commitment to embodiment, experimentation, and openness. This may be more true of such technologies as virtual

[224] Hayles op. cit. p. 54.

reality, sensory augmentation or the extension of the body via prosthetics and implants but, as I will try argue in the next chapter the current state of affairs suggest that in the case of biotechnologies besides undeniable openness there are very strong tendencies that recapture and challenged it toward normalization and the creation of an increasingly managed, surveilled and supervised body. Hence, I will now turn to a discussion of the current biopolitical landscape, keeping in mind that *we are all posthumans.*

- Chapter 3 -

Posthuman Biopolitics

Chapter Outline

Now that I have given a brief account of the contemporary and rather stalled debate about our imminent posthuman future and drawn attention to problems at the core of the quarrel I would like to shift the focus of inquiry to the biopolitical landscape that is inhabited by "us posthumans."
I am going to start by giving a brief account of the concept of biopolitics followed by a sketch of some technological developments that bare significance it.

I will then discuss two tendencies I consider to be crucially important. The first is the individualization of risk thinking that goes hand-in-hand with a notion governmentality literature has come to call "the neoliberal subject." Then I will make an attempt at outlining a current technology of the self that is structured around the notion of 'anxiety'.

The second trend concerns what Martin Weiss has called the 'dissolution of human nature'. It describes the growing malleability of biological processes on the one hand and also the dispersion of knowledge of this biological body in diverse databases, biobanks, probabilities and susceptibilities.

In both instances I will richly draw on examples of current technologies to illustrate my points.

Biopolitics

I have already briefly touched upon the multifaceted concept of biopolitics in the first chapter when discussing Russian Cosmism. Now I am going to give it a somewhat more detailed consideration.
In a lecture at the College de France in 1976 Michel Foucault first discussed the concept of biopolitics, which he described as a technology of power that emerged at the end of the 18th century. Biopolitics is a form of biopower, which is characterized by an attempt to administer and monitor the life and vitality of populations. Biopolitics was born when the management of life entered the realm of political calculations and when state control gradually took hold of the biological life of populations in the name of increasing and optimizing vitality.[225]

For Foucault the emergence of biopower signalled a transition from classic sovereignty that in his characterization was symbolised by the sword and the ability to take life. Sovereignty manifested itself mainly as an instance of threat and exploitation that had the power to appropriate the goods, work and blood of its subjects. The paradigm of biopower no longer restrains, cuts and curbs but rather seeks to control expand and arrange life itself.

The transition from sovereign-, to biopower marks a significant change in the overall structure of exercising power. Among other things Foucault located the source of this transformation in the increased agricultural and industrial production of the time as well as growing scientific and medical knowledge. At about this time societies confronted new challenges. Especially from the 19th century onwards famine and pestilence were not primary troubles. Concerns over increasing economic productivity and improving the quality of the population and hence of the workforce gained prominence. Foucault's notion of biopower consists of two poles connected by a bundle of intermediary sites.

> One technique is disciplinary; it centers on the body, produces individualizing effects, and manipulates the body as a source of forces that have to be rendered both useful and docile. And we also have a second technology which is centered not upon the body but upon life: [...] this is a technology which aims to establish a sort of homeostasis, not by training individuals, but by achieving an overall equilibrium that protects the security of the whole from internal dangers.[226]

Foucault saw a crucial precondition of the rise of capitalism and the constitution of modern nation states in the combination of disciplinary powers of individual control and regulatory powers of the population.[227] Complementary to the disciplinary techniques of anatomo-politics that seek to control and condition the individual body at various sights, such as schools, prisons, etc., this set of

[225] Foucault, M., Society Must Be Defended, Picador, New York, 2003., p. 243.
[226] Ibid. P. 249.
[227] Lemke, T.,Die politische Ökonomie des Lebens – Biopolitik und Rassismus bei Michel Foucault und Giorgio Agamben, in: Bröckling, U., Bühler, B., Hahn, M., Schöning, M, Weinberg, M., (Eds.), Disziplinen des Lebens. Zwischen Anthropologie, Literatur und Politik, Tübingen: Gunter Narr Verlag 2004, p. 257-274.

techniques is thus focused on the biological life of the human species qua species. Both forms of power function eminently through the creation of norms and grades of deviation and as Foucault says they are not mutually exclusive but rather mutually constitutive.[228]

Biopolitics is unseparable from the idea of protecting life from the dangers within. Thus it also entails an important shift, away from battling large epidemics that used to haunt societies prior to the relative security brought about by the 18th century. Endemics, or internal factors that threatened the health and productivity of nations progressively took center stage.[229] As Foucault argued, this rearrangement of state rationality also meant that the protection of the 'human stock' gained crucial relevance. Racism, which Foucault defined as "the break between what must live and what must die"[230], the fear of biological decline, degeneration and classical eugenics are all paradigmatic examples of this biopolitical logic.

Foucault's notion of biopolitics has exerted considerable influence on a number of thinkers and has become the object of constructive critique as well. Feminists, most notably Haraway have criticized that Foucault's concept of ordering, arranging and managing bodies still very much remains captivated by the notion of a unified and closed body.[231] However, especially after the 1970s and 80s, when he discussed the concept, significant changes have occurred that made it necessary to conceptualize the body as a more fluid, porous entity as Haraway herself tried to articulate it with the cyborg. In the wake of such critiques and more recent technoscientific developments Foucault himself could not have anticipated current scholars who draw on his work such as Nikolas Rose, Catherine Waldby, Thomas Lemke or Sarah Franklin take this fragmented, dissolving and lived body as the starting point of their investigations. So for example Franklin's work has revealed the utterly cyborgian nature of embryos as beings that are "others" and "us" at the same time while her work also critically engages with global biopolitics.

> its coming into being is both organic and technological. Though it is fully human (for what else can it be?), it is born of science, inhabits the timeless ice land of liquid-nitrogen storage tanks, and feeds on special (pure) culture in its petri dish. At once potential research material (scientific object), quasi-citizen (it has legal rights), and potential person (human subject), the embryo has a cyborg liminality in its contested location between science and nature.[232]

Despite a number of justified points of critique, important questions which Foucault considered central for his work, namely the topics of subjectification and power/knowledge relations continue to inspire. The growing field of governmentality studies takes Foucault's notion of power as a

[228] Foucault, op. cit.
[229] Ibid.
[230] Ibid. P. 254.
[231] Haraway, D., Simians, Cyborgs, and Women: The Reinvention of Nature, Routledge, 1990.
[232] Franklin, S., Postmodern Procreation: A Cultural Account of Assisted Reproduction, in Ginsburg, F.,D., Rapp, R., (eds.) Conceiving the New World Order: The Global Politics of Reproduction, University of California Press, Berkeley, 1995, p. 337.

productive rather than merely repressive force that creates subjectifications as its premise. This field of inquiry is located at the intersection of cultural anthropology, history of science and feminist scholarship.[233] It developed in the wake of Foucault's concept of governing and his "michrophysics of power". According to these, one

> […] has to take into account the interaction between those two types of techniques - techniques of domination and techniques of the self. He has to take into account the points where the technologies of domination of individuals over one another have recourse to processes by which the individual acts upon himself. And conversely, he has to take into account the points where the techniques of the self are integrated into structures of coercion or domination. The contact point, where the individuals are driven by others is tied to the way they conduct themselves, is what we can call, I think, government.[234]

Within governmentality studies the notion of the "neoliberal subject" is of high relevance and I believe it is also eminently important in relation to the topic of enhancement. Therefore I will now turn to a discussion of this rather ambiguous concept.

Choosing Ourselves – The Neoliberal Subject

Neoliberalism is a highly versatile, often quoted yet seldom understood concept that has gained enormous currency especially since the most recent global financial crisis that may have signalled the end of the so called 'neoliberal era.' I certainly do not claim to be any authority on the issue so my interpretation will represent one – most probably highly simplistic – understanding among many.

Usually, neoliberalism is equated with a very strong commitment to self-regulating global free markets, crippled government regulation and the model of the economic man. In this sense, it is the grandson of classical liberalism, with its emphasis of infallible, laissez-faire markets and autonomous individuals making informed choices. Neoliberalism's chief commitment can also be abbreviated into the D-L-P formula, which stands for:

"(1) deregulation (of the economy); (2) liberalization (of trade and industry); and (3) privatization (of state-owned enterprises)."[235] Yet neoliberalism also brought a large scale reconstruction of state rationality and indeed the public sphere as well. It introduced competitiveness, self-interest, and constant quantified quality controls into every sphere, as well as "the creation of highly individualized, performance-based work plans; and the introduction of 'rational choice' models that internalize and thus normalize market-oriented behaviour."[236]Its ascendance to prominence came in

[233] Lemke, T., Krasmann, S., Bröckling, U., Gouvernementalität, Neoliberalismus und Selbsttechnologien.,in Lemke, T., Krasmann, S., Bröckling, U.,(eds.) Gouvernementalität der Gegenwart, Suhrkamp Verlag, Frankfurt am Main, 2000. p. 7

[234] Foucault, M., About the Beginning of the Hermeneutics of the Self: Two Lectures at Dartmouth, in Political Theory, Vol. 21, No. 2 (May, 1993), pp. 198-227 here: p. 203.

[235] Steger, M., B., Roy, R.,K., Neoliberalism – A Very Short Introduction, Oxford University Press, 2010. p. 14.

[236] Ibid. P. 12.

the 1980s when Margaret Thatcher in the UK and Ronald Reagan in the US rose to power and attempted to act upon the crises of the 70s. They interpreted this crisis as the failure of Keynesianism, big government and the strong welfare state.[237] The new philosophy of individual responsibility instead of social solidarity was most emphatically expressed by Margaret Thatcher's famous statement that there's no such thing as society, only individual men and women who must first and foremost care for themselves.[238]

From a governmentality perspective it becomes clear that beyond deregulation, the dismantling of welfare provisions and structural adjustment policies neoliberalism also entailed a certain concept of what man is or should be. It is not merely a retreat of the political in favour of economics. By extending the logic of economics into almost every domain of life in an increasingly globalized and turbulent world the images of an enterprise culture and that of the entrepreneurial, flexible self were born.[239] Flexible, enterprising individuals were needed to keep the economy flourishing. Such persons had the benefit of having 'no strings attached' and could therefore adapt very quickly to changing market needs.[240] The image of the enterprising individual is premised on a view of the self as autonomous, choosing, rational; someone who pursues its own life-plans according to its own values and priorities.

> The self is to be a subjective being, it is to aspire to autonomy, it is to strive for personal fulfilment in its earthly life, it is to interpret its reality and destiny as a matter of individual responsibility, it is to find meaning in existence by shaping its life through acts of choice.[241]

In fact the level of self-fulfilment an individual has achieved has been "elevated to the status of an evaluative criterion"[242] such that living an active, rich, productive and fulfilling life are positioned almost as moral values. The current "flexible" capitalism thus incites individuals to initiate as many "projects" as possible. As Nikolas Rose put it "contemporary individuals are incited to live as if making a project of themselves […] to develop a 'style' of living that will maximize the worth of their existence to themselves."[243] Of course, the new freedoms, possibilities and promises of self-realization that are driving neoliberal individualization go hand in hand with very specific ideas about how to put these freedoms to use, namely in an economical, risk-minimizing, productivity enhancing manner.[244]

Interestingly, as I have already noted at the end of the first chapter, the 1980s was also the time when a very new and individualized form of utopianism emerged in the form of

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[237] Ibid.
[238] Interview with Margaret Thatcher for Woman's Own, http://www.margaretthatcher.org/speeches/displaydocument.asp?docid=106689 Last Accessed, 21. August 2010.
[239] Bröckling, U., Das Unternehmerische Selbst, Surhkamp Verlag, Frankfurt am Main, 2007.
[240] Ibid.
[241] Ibid p. 151.
[242] Boltanski, L., Chiapello., E., The New Spirit of Capitalism, 2007. Verso, London p. 429.
[243] Rose, N., Inventing Our Selves, Cambrdige Univesity Press, Cambridge, 1996, p. 157.
[244] Lemke, T., Krasmann, S., Bröckling, U., op. Cit.

transhumanism. Early visionaries echoed quite precisely the neoliberal call to boundless self-realization, which they thought best achievable in a free-market system. They may be seen as the first who have extended project-thinking to the level individual biology as well.

Thus we have an interesting contradiction before us. The concepts of the cyborg and the posthuman have significantly stressed fracture and the dissolution of stable and fixed identities and unitary selves. Yet, as Nikolas Rose notes, at the very moment when countless accounts of the passing and demise of the image of the self as stable, unified and autonomous emerge in philosophy and social theory

> regulatory practices seek to govern individuals in a way more tied to their 'selfhood' than ever before, and the ideas of identity and its cognates have acquired an increased salience in so many of the practices in which human beings engage[245]

Thus regulatory practices address people ever more "as if they were" the kind of autonomous, individualized selves motivated by the desire of self-fulfilment.[246] This duality will be a key feature of the contemporary biopolitical landscape.

During the 1980s and 1990s the principle of self-governance and individual responsibility also gained prevalence in relation to issues of health. As Herbert Gottweis notes, the "idea of the managing of the self is also reflected in a multitude of technical and organizational novelties within healthcare, in which managed care is the most important and most paradigmatic example."[247] Thus responsibility and individualized project thinking also extend to the level of managing our biological constitution, preferably in a prudent, responsible and calculating manner. This type of managerial attitude towards individual biology also represents a shift from a mere preoccupation with disease to the management of normalcy itself.

Before turning to a discussion of this development and other features of the biopolitical landscape I want to briefly sketch a very important shift in molecular biology and genetics that bears a significant influence for governing practices.

From Genetic Determinism to Genetic Susceptibility

In the 1970s geneticists discovered that DNA consisted of so called coding and non-coding regions, which they labelled introns and exons respectively. Non-coding DNA has also been labelled "junk DNA" because no clear role could be assigned to it, so the assumption was that it served as a kind of redundant buffer.[248] Up until the completion of the Human Genome Project the majority of

[245] Rose, N., Inventing Ourselves, Cambridge University Press, 1998. p. 169.
[246] Ibid.
[247] Gottweis, H., Regulating genomics in the 21st century: from logos to pathos?, TRENDS in Biotechnology Vol.23 No.3 March 2005 p. 118.
[248] Rheninberger, HJ., Müller-Wille, S., Technische Reproduzierbarkeit organischer Natur – aus der Perspektive einer

geneticists also thought that it was possible to use a schematic argumentation that proceeded from DNA to RNA to proteins to cells. This unidirectional model could in principle explain the structure and function of organisms. This has come to be known as the Central Dogma of molecular biology.[249] In effect, this is a deterministic model that was inherent to the metaphor of the genetic *code*. This conceptualization was a classic example of what we might call a depth-surface ontology where the visible surface features of the phenotype were defined by the invisible, underlying genetic code.

These views of a unidirectional flow as well as the genotype-phenotype distinction have been questioned ever since they first emerged. However, they have been largely discredited by the time of the completion of the Human Genome Project. This decline is somewhat ironic, because the grand project was motivated by the belief that the genotype/phenotype relationship can finally be clarified. Thus, after almost exactly 100 years following the rediscovery of Mendelian inheritance in 1900, this reductionist view has faded. It has turned out that what scientists believed to be junk DNA does after all play a significant role in such crucial events as "the timing of processes that occur during development, including stem cell maintenance, cell proliferation, apoptosis (programmed cell death), and the occurrence of cancer and other complex ailments."[250]

Whereas about twenty years ago it was possible to believe that the sequence of base pairs contained all the information necessary to crack diseases, develop miracle cures and set genetic engineering on a glorious path the Central Dogma of genetics is now a thing of the past and genes have been reduced to a much more humble role in heredity.[251] It is remarkable though, that criticism of the Central Dogma had been present in a number of other disciplines such as clinical genetics, developmental biology, population genetics or cell biology. These disciplines have held that sequencing the genome would provide us little to no knowledge about disease onset, course and treatment.[252] How the Human Genome Project could still get under way with massive promises in terms of cures is rather mysterious, but does not belong to the topic of this thesis. I only wish to remark that Carlos Novas' term "political economy of hope"[253] neatly captures how the overblown promises of a scientific discipline could get a multi-billion dollar global research project underway despite massive criticism that finally even turned out to be correct.

In either case, the new catch-phrases are postgenomics, proteomics and epigenetics that shift the emphasis away from the genetic code itself to the complex factors that regulate gene expression

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Geschichte der Molekularbiologie, in Weiss, M.,G., (ed.) Bios und Zoë, Suhrkamp, Frankfurt am Main 2009.

[249] Crick, F., Central dogma of molecular biology, Nature, 1970., 227:561-3

[250] Lock, M., The Eclipse of the Gene and the Rise of Divination, Current Anthropology Volume 46, Supplement, December 2005 pp. 47-70.

[251] Keller, E., F., Century of the Gene, Harvard Univesity Press 2000.

[252] Lock, op. cit

[253] Novas, C., The political economy of hope: patients organizations, science and biovalue, in: Biosocieties 2006., 1:3:289-305

and involve RNA, proteins and the cellular milieu itself.[254] As Margaret Lock writes:

> With increasing energy, the attention of many researchers is focused on a new space situated *between* the genotype and phenotype, a site where "endophenotypes" […] make their appearance and arguments about causality based on linearity and determinism make no sense. Recognition of the contributions of individual development, aging, and the environment to activity at the molecular level has dethroned the preordained genetic body and set in its place a much more fluid, elusive entity.[…] Organisms are clearly more than the sum of their parts[…], and it is now undeniable that genes *determine* very little, if anything, and are merely actors in an extraordinarily complex scenario.[255]

This transformation is of major significance because it fundamentally makes arguments predicated upon genetic determinism irreversibly outmoded. As a result of this rearrangement a new focus has emerged that takes genetic susceptibilities as its target with considerable implications for governance practices.

"at risk" – Being Genetically Responsible

Currently, biopolitics is characterized by at least two, seemingly contradictory tendencies. On the one hand, we see the ever expanding importance of individual care and self-governance and the expectation to exercise prudent individual choice. On the other hand, we see the dissolution of the individual in bodily markers, biobank data and biological processes. These two trends – and probably a number of others that are not the focus of attention here – are simultaneously present. Thus, while the very notion of an autonomous, bounded, choosing self is dissolving, regulatory practices appeal more and more to this very image of the prudent, self-governing individual.

One site where this change is easily graspable is the focus of postgenomics to act upon susceptibilities. A new style of reasoning has emerged that takes an individuals susceptibilities to certain diseases as the basis of action in the present. If grand-scale eugenics programmes have been supplanted by consumer driver liberal eugenics, then analogously the orientation of liberal eugenics is no longer the population at large but rather individual predispositions. At the intersection of discourses on individual risk, genetification, and the promissory culture[256] surrounding biomedical possibilities we see the birth of individuals "at genetic risk." Such individuals have been identified to carry a predisposition for diseases with a genetic component. Being at risk may be understood as having a certain susceptibility to develop illnesses that affect the individual or close kin.

The identification of risks may be precise, as in the case of Huntington's chorea or probabilistic, as in the case of breast cancer and most other complex diseases. This identification is possible before any symptoms are manifest, which leads to a new 'category' of persons who are

[254] Rheinberger op. Cit.
[255] Lock, op. cit. p50
[256] Rose, N., Genomic Susceptibility as an emergent form of life? In Burri, R., V., Dumit, J., (eds.) Biomedicine as Culture, Routledge, 2007. P. 143.

"asymptomatically ill." Despite their perfectly normal condition and maybe even without much certainty about whether they will ever develop a specific disease these individuals often find themselves entangled in the web of biomedicine and subjected to surveillance and preventive measures. They are incited to take a proactive stance towards their biological constitution. As Rose writes,

> […] the reorganization of many illnesses and pathologies along a genetic axis does not generate fatalism. On the contrary it creates an obligation to act in the present in relation to the potential futures that now come into view.[257]

This obligation to act arises where the image of prudent, self-governing individual confronts discourses of individual risk. Gaining knowledge, and to a far lesser extent, a possibility to intervene and act put individuals in a position where they need to reconsider some of their bonds to others, most notably to potential future kin. They are invested with 'genetic responsibility' that influences their identities and social relationships.[258]

> It would be a form of life where the responsible citizen would have the obligation to know and manage his or her life of susceptibilities – a kind of permanent management of genomic uncertainties. [259]

I believe this example beautifully highlights the features of our post-human condition. The image of the post-human lifeform taking shape in front of us is neither that of the dehumanized and instrumentalized being stripped of its essence that Habermas and Fukuyama fear, nor the technologically enabled posthuman reshaping itself at its own fancy. Rather, we confront 'prudent' individuals who recognize their embeddedness in growing webs of interaction that tie them to their ancestors, their potential offspring and to a number of other potential kin through the mediation of technoscientific knowledge and practices. I believe this reading would foreground the positive and liberatory aspect that is, doubtless, implicated by this technology. Biology has to some extent become open to intervention and is longer the equivalent of destiny. It might serve to exemplify that people are incorporating knowledge about a certain – biological – aspect of their existence into their lives and acting upon it in a responsible manner.

However, I believe the all-pervasive presence of the neoliberal narrative of self-governance in the sake of productivity casts some serious shadows over this interpretation. The problematic developments implicated by the shift towards the search for susceptibilities are obvious for example in the field of environmental health research. As Lemke states,

> While research in this field traditionally concentrated on identifying external risk factors that pose health problems to employees, more and more scientific emphasis is put on recognizing internal risks of personal susceptibilities that are based on the genetic makeup of

[257] Rose, N., (2007) The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century, Princeton University Press, Princeton, NJ. P. 107.
[258] Op. cit. p. 125.
[259] Rose, N., Genomic Susceptibility as an emergent form of life? In Burri, R., V., Dumit, J., (eds.) Biomedicine as Culture, Routledge, 2007.

> individuals… Since there are more and more genetic tests for different conditions available, there is a real danger that employers might use genetic information to determine how "genetically fit" someone is for a job.[260]

Somatic Individuality

One of the consequences of the biotechnology revolution is that our biological constitution is becoming increasingly relevant and thematised along the lines of a valuable asset. Catherine Waldby has introduced the notion of 'biovalue', which "refers to the yield of vitality produced by the biotechnical reformulation of living processes."[261] Such living processes are stems cells, embryos, bacteria and other forms organisms which can be utilized to create a surplus of life and monetary value as well. We can also see the growing valorisation of the body and biological traits themselves. Who we are is increasingly defined by our biological make-up and by the proactive stance we take in relation to our natural endowments either in the form of acting upon risks or by constantly striving for improvement. As our self-understanding comes to be shaped by biomedicine and by the actual and promised possibilities of biotechnologies even our understanding of personhood is being interpreted "by others, and by ourselves, in terms of our contemporary understandings of the possibilities and limits of our corporeality."[262]

"Somatic individuality"[263] is the term Nikolas Rose uses to describe thinking of individuality in bodily terms. This allows for the body to serve as a fundamental site of acting upon ourselves, by the means provided mostly by biomedicine. Somatic individuals are „beings whose individuality is, in part at least, grounded within our fleshly, corporeal existence, and who experience, articulate, judge, and act upon ourselves in part in the language of biomedicine."[264] The growing importance of this somatic side to our lives is evidenced by the myriads of discourses surrounding health, the body, suffering, dieting, exercising, flourishing, etc. This trend even extends to our mental lives as our psychological 'inner space' is increasingly mapped upon the brain. This opens interventions into personality traits at the molecular level.[265] An interesting case in point is for example the use of the psychiatric drug Prozac that has caused quite some turbulence when it first hit the markets. As Peter Kramer noted in his controversial book *Listening to Prozac* a number

[260] Lemke, T., Susceptible individuals and risky rights, in Burri, R., V., Dumit, J., (eds.) Biomedicine as Culture, Routledge, 2007.p. 158.
[261] Waldby, C., Stem cells, tissue cultures and the production of biovalue, health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine Vol 6(3): 305–323 p. 310
[262] Rose, N., The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century, Princeton University Press, Princeton, NJ, 2007, p. 76
[263] Novas, C., Rose, N., (2000) Genetic Risk and the Birth of the Somatic Individual', Economy and Society, Vol. 29, No. 4, pp. 485-513.
[264] Rose, op. Cit. P.26.
[265] Rose, N., 'Neurochemical Selves', Society, Vol. 41, No. 1, 2003. pp. 46-59

of patients who took the medication felt as if they were finally restored to their true selves.[266] It is an interesting observation that highlights how technological interventions that dislocate the natural – namely the original neurochemical balance of the brain – merge with the sensation of authenticity. Hence, this authenticity is at least partially the result of a technological intervention in nature, which was originally experienced as somehow "false".

As our biology becomes more open to choice and as we learn to act upon it and integrate knowledge about it into our lives, we simultaneously become responsible for the design we choose for our bodies.[267] With the possibility of intervention comes inevitable responsibility.[268]

In fact, the reorganization of illnesses along a genetic axis also entails that fundamental notions, such as autonomy are reinterpreted. In order to be autonomous and act prudently one *must* take genetic information into account since failure to do so would not be seen as an individual act of choice but rather the demonstration of profound irresponsibility.[269] Biotechnological enhancement may be understood in this framework as a manifestation of neoliberal governmentality, in which the political goals of improved productivity are intertwined with self-technologies aimed at securing, optimizing and improving individual health and well-being. Developing Foucault's concepts of discipline and biopolitics further Rose terms the type of politics that forms around the governance of somatic individuals ethopolitics.

> If discipline individualizes and normalizes, and biopower collectivizes and socializes, ethopolitics concerns itself with the self-techniques by which human beings should judge themselves and act upon themselves to make themselves better than they are.[270]

He describes this as an ethic that is centred around the notion of maximizing potential health and quality of life and which entails that those individuals who, for whatever reason, do not take part in this project are adjudicated negatively.[271]

I believe the concept of somatic individuality captures a very important development. In the next section I will attempt to contribute to the further elaboration of this idea by discussing an aspect Rose leaves mostly unreflected, namely the destabilizing effect of becoming somatic individuals within a biopolitical landscape that is suffused by the dread of risks and insecurities. I now turn to what I would like to call the *anxious individual*, or *anxious subject*.

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[266] Kramer, P.,D., Listening to Prozac, Viking Press, New York, 1996.
[267] Negrin, L., 'Cosmetic Surgery and the Eclipse of Identity', *Body & Society*, Vol. 8, No. 4, 2002, pp. 21-42
[268] Harris J., Enhancing Evolution, 2007. Princeton University Press. p. 118.
[269] Lemke, T., Die Regierung der Risiken. Von der Eugenik zur genetischen Gouvernementalität, in Lemke, T., Krasmann, S., Bröckling, U.,(eds.) Gouvernementalität der Gegenwart, Suhrkamp Verlag, Frankfurt am Main, 2000
[270] Rose, N., (2001) The Politics of Life Itself. Theory, Culture & Society vol. 18, p.18.
[271] Ibid.

The Anxious Individual

There are many ways of understanding anxiety. On the one hand, it is an affective state of unease, worry and restlessness that seems to lack any specific directedness and which is probably common to most of us. This feeling of 'homelessness' has also played a central role in the existentialist philosophies of Søren Kierkegaard[272] and Martin Heidegger.[273] Here, the free floating, ungraspable and indefinable feeling of anxiety constitutes the fundamental condition of being human. It is through the torments of anxiety that the depths of life are revealed. For these thinkers anxiety is essential and productive for it is the precondition of human freedom and deep reflection, wherefore anxiety needs to be faced and lived rather than evaded.

On a slightly different note, anxiety has been associated with the discontent brought about by modernity itself. Processes of modernization loosen traditional bonds, introduce relativism and seem incapable of providing a framework of meaning for the lives of individuals beyond a bleak vision of progress, which itself has been largely shattered by the cataclysms of the 20th century. It is a recurrent theme in a number of writers since the 19th century both in the U.S. and in Europe to condemn their age as one of anxiety and uncertainty.[274] Anxiety has been considered an expression of the individual's struggle in a world she perceives to be 'wrong' in a profound sense. The idea that the very form of life characteristic of modern societies engenders feelings of insecurity has a fairly long history such that by the end of the last century it had become something of a commonplace.

Decisions made in a biomedical context can be seen as 'existential choices', which necessarily give rise to great anxiety. This anxiety doesn't merely represent a quantifiable factor in risk calculation, but is rather a fundamental *concern* for the integrity of one's life.

I believe we can also understand anxiety somewhat analogous to a technology of the self in a Foucauldian sense that emerges as a result of current practices aimed at reshaping our relation to our bodies. According to Foucault's definition technologies of the self

> permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality.[275]

By discussing anxiety, or the anxious subject below I want to contribute to Nikolas Rose's term somatic individuality by adding a further shade to it. Somatic individuality does not merely mean that our individuality is increasingly experienced and acted upon in the language and means

[272] See Kierkegaard, S., (1844/1980) The Concept of Anxiety : Kierkegaard's Writings, Vol. 8., Princeton University Press, Princeton, NJ
[273] See Heidegger, M., (1927/1962) Being and Time, Basil Blackwell, Oxford, esp. §40. p. 228.
[274] Wilkinson, I., (2001) Anxiety in a Risk Society. Routledge, London
[275] Foucault, M., (1988) Technologies of the self. In Martin, L. H., Gutman, H., Hutton P. H., (eds.) Technologies of the self. University of Massachusetts Press, Amherst, p. 17.

provided by biomedicine. I believe it also entails certain tensions as our current biopolitical landscape, which is permeated by the idea of 'risk' brings forth a specific norm, namely the norm of constant worry and rumination over one's biology. Of course, worries exist also, more broadly about political, environmental and other risks. It is important to note that I am not arguing for the case that individuals have necessarily become more anxious in the psychological sense.[276] I also believe the dynamics at work here are not like everyday fear of disease or ill-ness. Rather, it seems to me to be the case that certain analogies exist between states of anxiety and forms of self-governance.

One such analogy is the increased concern with which we deal with our biological existence. The internalization of the norm of restless concern has almost become an integral part of our notion of responsibility. The term 'anxious subject' is in my view an adequate one because the type of worry that current discourses of risk instil is not necessarily targeted at anything specific, or perhaps targeted at *everything* in relation to our biological existence, which thus becomes something quite elusive. Being concerned and worried about our bodily state in general becomes the norm, which then manifests itself in myriads of different forms.

The increasing role that our biological characteristics and bodily well-being play in making sense of our identity simultaneously destabilizes the lived experience of the body. As Martin Weiss argues, previous discourses of genetic determinism solidified a certain biological destiny, but they also allowed the affected person to develop an attitude of acceptance and learn to live with the given. Contrary to this, discourses of susceptibility seem to construe the whole of an individual's biological constitution as a source of risk, as something that poses potential threats unless carefully supervised,[277] even though the outcomes of this supervision are often quite uncertain.

Of course, in a certain sense the body has always been a source of great anxiety because at some fundamental level it is beyond the individual's rational control and its signs and signals serve as the most vivid reminders of our vulnerable, fragile and ephemeral nature. However, the phenomenology, the lived experience of the body has thus far remained mostly uncontested, whereas now categories such as 'at risk' or 'presymptomatically ill' dislocate, or at least contest first-person experiences by claiming to speak the language of scientific objectivity. Discourses on genetic susceptibility further exacerbate this, for they incite the individual to counter a possible but vague future and act in the present, whereby the actual effects of the actions taken also remain unclear. The real outcomes of preventive measures can never be fully known.

[276] Even though the incidence of anxiety disorders seem to be on the rise, the cause of this is not easy to determine, and may be due to the medicalization of negative affects instead of actual rise in incidence. See also Horwitz, A. W., Wakefield, J. C., (2007) The Loss of Sadness - How Psychiatry Transformed Normal Sorrow into Depressive Disorder, Oxford University Press, New York

[277] Weiss, M., Die Auflösung der menschlichen Natur, in Weiss, M., (ed.) Bios und Zoë, Suhrkamp Verlag, Frankfurt am Main, 2009., pp. 34-54.

Experiences of derealization and depersonalization – during which one's body or surroundings are experienced as frighteningly alien – often form symptoms of anxiety disorders.[278] This sense of derealization seems analogous to the kind of dissociation that risk thinking and the objectification of every aspect of bodily functioning involve. The same way severely anxious states may involve that one feels estranged from the world or one's body, so too does being 'at risk' dissociate experience from 'scientific fact'. To belong to the group of the presymptomatically ill entails that one's first person account of herself and her health contradicts that of medical discourse. In essence the person is alienated from her own lived experience. Furthermore, probabilistic accounts of risks are generally perceived to be alien from everyday thinking and therefore very difficult to grasp and integrate, while putting forth a strong claim to authority.[279]

The ever broadening spectrum of medicalization is also a strong catalyst of this process. As more and more phenomena come to be viewed as belonging under medical jurisdiction – such as birth, (successful) ageing, reproduction, nutrition, beauty, physical and intellectual fitness, emotional life, etc. – more and more areas of life require our prudent, active engagement and careful concern. We also become more dependent on medical vocabularies to make sense of our own experiences. This, in effect leads to a form of constant self-monitoring, which is also quite akin to that of anxious states. To exaggerate the situation slightly, I could say that each and every sign of the body, signs of its functioning, ageing and change become invested with great meaning and may be interpreted as potential (medical) problems that need attention and conscious intervention.

An interesting demonstration of the way this regime of anxious self-concern may become normalized is provided by Carmen Baumeler's analysis of 'affective computing' that may also be seen as a form of enhancement system. Such, as of yet hypothetical systems are wearable computing devices that monitor stress related physiological changes in order to help prevent cardiovascular disease. The system is also linked to a centre where an individual health expert monitors the values and via video link gives advice on how to manage distress and negative emotions. In an example the user devotes a considerable amount of attention to the handling of her stress levels and checks in to see her values about 5 times a day. According to Baumeler "this application demonstrates, [that] users are supposed to manage stress themselves and, therefore, stay healthy and productive."[280] The author intends this example to show how the individualization of emotion management is linked to the production of the ideal 'flexible worker'.[281] The objectifying

[278] Simeon, D., Knutelska, M., Nelson, D., Guralnik, O., (2003) Feeling unreal: a depersonalization disorder update of 117 cases. Journal of Clinical Psychiatry Vol. 64 No. 9. pp. 990-7.
[279] Lock, M., The Future is Now: Locating Biomarkers for Dementia in: Burri, R, V., Dumit, J., Biomedicine as Culture, Routledge, New York, 2007.
[280] Baumeler, C., (2008) Technologies of the Emotional Self: Affective Computing and the "Enhanced Second Skin" for Flexible Employees, in Karafyllis, N. C., Ulshöfer, G., Sexualized Brains, MIT Press, Cambrdige, p. 188.
[281] On the flexible individual see e.g. Sennett, R., The Corrosion of Character, W. W. Norton & Company

gaze directed at one's own body, this constant rumination, the drive to check, recheck and double-check to see whether everything is OK according to some scientifically established criterion is also the hallmark of anxious self-concern. This example seems to be the paradigmatic expression of the responsible/anxious subject of the future.

Similarly, in my view a number of current developments suggest that the expectation to internalize this objectified account of our vitality and well-being is growing. So for example we see calls to adjust our dietary and training habits to objectively quantified values, which has been dubbed "living by numbers."[282] Also, future developments in medical imaging and monitoring promise the convergence of medical devices with smart phones and handheld computers, such that "monitoring your vital sins 24/7/365" will become the routine.[283] These depictions testify to an image of the person who is constantly preoccupied with optimizing her status of health by reverting to medical technologies. Interestingly, they are also in my view essentially "solipsistic" technologies in the sense that this form of surveillance takes the individual as an entity that is sufficiently characterized by such data as heart rate, breath rate, blood sugar, pulse, etc. that are taken to mean something essential regardless of context.

Thus they do not merely offer a technology but establish a certain norm that channels the lived experiences of embodiment into the manageable realm of having a scientifically supervised body. It creates the norm of constant concernedness with the appropriate functioning of the body that is also greatly driven by the expectations of flexibility, efficiency and productivity.

I believe the notion of the anxious individual may serve to exemplify how self-practices are shaped to live up to the task of properly, prudently and responsibly managing our biological constitution under a regime of preventive medicine. This form of subjectivity emerges at the intersection of discourses on risk, susceptibility and prudent self-management. Becoming somatic individuals in an age of risk also involves internalizing the norms of anxious self-concern.

While there are individual risks we may also speak of collective risks like those that threaten whole communities or perhaps even mankind itself. With the already noted shift towards communitarian principles, an interest in population protection and the intertwined nature of self-governance with the primary preventive logic of state rationality we see that individual worries and fears may very well be employed for the sake of protecting communities. Thus, attempts at identifying people who present risks to broader society are also on the rise. We find calls for the creation of population wide

[282] Wired Magazine, How to Live by the Numbers: Health, 22.6.2009. http://www.wired.com/medtech/health/magazine/17-07/lbnp_health Last retrieved 20 August 2010

[283] Topol, E., The Future of Wireless Medicine, Presentation at the conference Technology, Entertainment and Design, Feburary 2010. http://www.ted.com/talks/eric_topol_the_wireless_future_of_medicine.html last retrieved 20 August 2010.

forensic genetic databases,[284] programs to screen for potentially dangerous personality disorders[285] and the introduction of such measures as the Indeterminate Public Protection Sentence in the UK in 2003.[286] This leads me to a discussion of the other major trend of the current biopolitical landscape, namely the dissolution of the body in patterns of dispersed information. These developments bring out other dangers involved in the widespread use of screening technologies, namely that they

> have the potential to lead to a less optimistic future, in which widespread screening for biomarkers of future psychopathology or undesirable conduct, notably those made possible by developments in genetic profiling and brain-scanning, would lead to a significant increase in preventive interventions in the name of public protection.[287]

The Dissolution of Human Nature

While neoliberal narratives constantly reinforce the role of personal choice, individual autonomy and self-governance we also see signs to the contrary. For example, in an article about the future of bioethics Ruth Chadwick and Martha Knoppers argued that there is currently a shift towards communitarian principles in bioethics, which means that the individual, while still serving as a crucially important factor will lose its centrality.[288] One of the principle reasons the authors give for the rise of communitarian principles is the growing relevance of population-wide genetic research programs "that call for rethinking the paramount position of the individual in ethics."[289]

In relation to this Martin Weiss has argued that recent biotechnological developments have dismantled our previous understanding of 'human nature' as something solid and unchangeable and have made it fundamentally malleable. Instead human nature now stands for a wide array of biological traits, susceptibilities, neurotransmitter levels and so on. The individual is in a certain sense deconstructed and finds itself dissolved in all these data that are preserved in large and anonymous biobanks. Gottweis also considers decorporalization a crucial element of current biopolitics as the materiality of the body is dissolved in large databases into informational entities and statistical probabilities.[290] According to Weiss this dissolution of the subject is complemented by the dissolution of the classical form of state sovereignty as biopolitical grand projects are things of the past and have given way to a dispersed network of performative discourses that

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[284] Townsend M., Ashtana, A., Put young children on DNA list, urge police, The Guardian Online, http://www.guardian.co.uk/society/2008/mar/16/youthjustice.children Last accessed 21. January 2010.

[285] See: Dangerous People with Severe Personality Disorder, http://www.dspdprogramme.gov.uk/ Last accessed 21. January 2010

[286] See Prisoners' Advice Service - Information Sheet http://www.prisonersadvice.org.uk/documents/MicrosoftWord-IPP2008.pdf Last accessed 20 August 2010.

[287] Rose, N., Screen and Intervene, History of the Human Sciences 2010; 23; 79. p. 96.

[288] Knoppers, B, M., Chadwick, R., Human Genetic Research: Emerging Trends in Ethics, Nature Reviews: Genetics January 2005; 6:75–79

[289] Ibid. P. 75

[290] Gottweis, H., Biobanks in action New strategies in the governance of life, in Gottweis, H., Petersen, A., (eds.) Biobanks: Governance in comparative perspective, 2008. Routledge, London

simultaneously construct and dispel the idea of an autonomous individual.[291] We are incited to act responsibly in the management of our vitality, yet, the principle guiding our own individual prudent action is increasingly the good of society. As Weiss concludes, self-governance and heteronomy are inseparably intertwined.[292] Perhaps we are currently witnessing the reinvention of sociality in the form of 'neosociality'.

> Neosocial society, in the words of Stephan Lessenich, 'constitutes itself as a subject that demands active citizenship. Society is now prime reference of sociality and evaluates individual activities according to their degree of sociality' […] This requires the individual's capacity to monitor and control themselves – for the benefit of themselves and society. […] Being neosocial is thus tantamount to individuals that flexibly govern themselves and others by way of socially accepted means.[293]

Hence we must raise the question whether intervening in biology – also for the sake of enhancement – does not harbour the risk of running exactly the opposite course as its supporters wish. Whether it could not be the case that the malleability of nature leads to an ever stronger re-inscription of social expectations? The next section looks at a scenario where risk thinking and the dissolution and dispersion of the body take on a rather radicalized and appalling form.

From Freedom to Necessity

As I have already briefly discussed Knoppers and Chadwick spoke of a communitarian turn in bioethics that mirrors actual developments in the biosciences. I would now like to introduce an example that takes the combination of risk-thinking and the communitarian turn to an extreme. I suggest that by using a somewhat exaggerated example I can capture some salient features of likely developments. My example comes from Julian Savulescu who heads the Uehiro Centre for Practical Ethics at Oxford University.

Savulescu is one of the most outspoken proponents of enhancement technologies and because such thinkers are often accused of being harbingers of a new form of eugenics he made an effort to distinguish the project of enhancement from the dark past. In an attempt to justify the parental obligation to enhance Julian Savulescu wanted to separate the 'old' eugenics from current practices. He wrote

> What was objectionable about the eugenics movement, besides its shoddy scientific basis, was that it involved the imposition of a State vision for a healthy population and aimed to achieve this through coercion. The eugenics movement was not aimed at what was good for individuals, but rather what benefited society. Modern eugenics in the form of testing for disorders, such as Down syndrome, occurs very commonly

[291] Weiss, M., Die Auflösung der menschlichen Natur, in Weiss, M., (ed) Bios und Zoe, 2009. Suhrkamp, Frankfurt p. 51
[292] Op. cit. p. 52
[293] Maasen, S., Sutter, B., Duttweiler, S., Self-Help: The Making of Neosocial Selves in Neoliberal Society, in Maasen, S., B., Duttweiler, On Willing Selves, 2007. Palgrave Macmillan, New York, p. 28.

> but is acceptable because it is voluntary, gives couples a choice over what kind of child to have, and enables them to have a child with the greatest opportunity for a good life.[294]

In this section I want to first investigate just how free these choices actually are from a techno-progessive position and argue that they are far less so than presumed by Savulescu.

First, of all, in light of what has been said so far, it is obvious that the notion of "voluntary choice" is far from being self-evident or unproblematic. However, his argument is impossible to defend even on its own terms. Savulescu has expressed the opinion that parents not only have the option to enhance their children but that there is an obligation to do so. He claims that in a situation where biological enhancements were available we would actually wrong our children if we failed to provide everything scientifically possible in order to ensure their future success.

> Unless there is something special and optimal about our children's physical, psychological, or cognitive abilities, or something different about other biological interventions, it would be wrong not to enhance them.[295]

Of course, Savulescu argues that there is in fact no relevant difference between biological and other kinds of interventions. Problematic is that he does not explicate the meaning of the term "optimal" and given the notion's versatility and slippery nature it actually seems that no child truly be considered optimal in all the relevant aspects. Thus his position seems to be at odds with the previous claim that individuals are free to decide on what kind of a child to have. It seems rather that they are obliged to have an "optimal" child otherwise they wrong the child. Failure to enhance certain traits – which Savulescu calls "all purpose means" – might very well be perceived as being equivalent to a form of child neglect or a serious omission on the side of the parent. Savulescu's initially rather liberal sounding embracement of enhancement as an expansion of individual liberty turns out to be totally compatible with the imposition of socially 'enforced' or expected interventions as long as the enhancement in question had been deemed by some external standard to serve the best interests of the child.[296] Savulescu might reply that we can draw a distinction between a moral obligation and a legal obligation. He might claim that it is morally wrong not to enhance, yet failure to do so does not lead to any legal penalties. Yet, if we consider that his argument is to a certain extent predicated upon the complete abolishment of any difference between biological interventions and other forms of enhancement, such as education it becomes clear that failure of parents to enhance their child might incur legal penalties just as their failure to comply with mandatory education does.

Now, as long as the biological interventions are aimed at such traits as intelligence we might be lenient and even grant that he has point. His argument gives reason to worry when he expands

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[294] Savulescu, J., Genetic Interventions and the ethics of enhancement of human beings, http://www.abc.net.au/rn/backgroundbriefing/documents/savulescu_chapter.pdf Last Accessed 20 August 2010.
[295] Savulescu ibid.
[296] Sandel op. cit. p. 79

the circle of attributes necessitating intervention to personality traits such as antisocial behaviour, which he considers to be a significant impediment to a "minimally decent life." Thus, procreative liberty, which is a highly praised value and guiding principle for Savulescu might, in an extreme case, become subordinate to prescriptions or at least the actual set of social expectations concerning the desired biological make-up of people.

This conclusion would in some sense align very well with the observation of Ruth Chadwick and Martha Knoppers that there is currently a shift towards communitarian principles in bioethics.[297] Even though the authors seem to welcome this change I believe that the communitarian values on the rise at the moment are deeply troubling. What is troubling is the way the increased role of populations links up with thinking in terms of risks and prevention, which could make us loosen our commitment to liberal democracy far more than we would want to.

On some occasions Savulescu has articulated the view that we may need biological adjustments because we are simply not fit to deal with the technological prowess we have come to possess. He believes that we will need to loosen our commitment to liberalism and the idea of democratic neutrality in order to face these challenges. In this model surveillance, being 'at risk' and the 'screen and intervene' regime described by Nikolas Rose gain a whole new meaning. Savulescu extends the idea of genetic risk to mean a potential threat to the human community broadly construed. Here is a clear expression of preference for communitarian principles. As an ardent supporter of enhancement technologies his views also faithfully depict the derogatory stance many have adopted of the nature of human existence which Savulescu interprets as an ultimately deficient form of life. In agreement with Hobbes Savulescu considers "the life of man, solitary, poor, nasty, brutish, and short"[298], hence in dire need of technological improvement.

Savulescu uses colourful and definitely pathetic language to illustrate our moral limitations and in effect raises the question how the radically deficient and limited human animal could be tamed with the help of biotechnologies.[299] His question is ultimately the same as Sloterdijk's from a decade ago, his answer is far less philosophically complicated. While he is motivated by the noble goal of ensuring human flourishing his conclusions make one more worried than relaxed. Technology is too powerful for our limited nature to control so we must make ourselves fit for the future. Thus, we confront another explication of the original cyborg idea. In this case, the "inhospitable" environment is provided by our own technologically permeated world that risks

[297] Knoppers, B, M., Chadwick, R., Human Genetic Research: Emerging Trends in Ethics, Nature Reviews: Genetics January 2005; 6:75–79

[298] Hobbes, T., Leviathan, Biblio Bazaar, 1651/2008. p. 111.

[299] Savulescu, J., Genetically Enhance Humanity of Face Extinction, Lecture given at the Festival of Dangerous Ideas, Sydney Opera House, October 2009 http://ieet.org/index.php/IEET/more/savulescu20091116/ Last Accessed 21 August 2010

driving us to extinction due to our own deficiencies.[300]

On this account enhancement is no longer proposed as an option of individual choice, it is no longer an issue of morphological freedom, distributive justice, or a question of emancipating humanity from nature's confines. It becomes a preventive measure.[301] For Savulescu prevention is best achieved by monitoring the population very closely and by applying genetic selection in order to screen out those individuals who may pose a risk to society. Individuals are dangerous because our technological progress easily puts the potential of mass destruction at the fingertips of individuals over whom we have no control or oversight.[302]

Thus for Savulescu it seems that in order to secure the safe and flourishing existence of mankind on its continued path of technological advancement we *need* to employ biological enhancements to become better than we are. It is no longer a question of will, desire or decision but one of necessity. Yet, at the point where enhancement is drawn into the realm of risk-thinking and prevention, and framed as an unavoidable "must" the ground becomes very shaky and we are drawn dangerously close to a system that considers population level interventions necessary in order to guarantee security. At this point his attempts to fundamentally separate the "old" eugenics from the "new" also collapses.

All in all, it may turn out that human enhancement, which is usually couched in discussions on individual liberties and the fulfilment of human potentials in the end dissolves its very foundations and contributes to a far more, rather than a far less constrained, disciplined and normalized society.

I certainly do not mean to say that Savulescu's position represents a standard or even a mainstream in current debates. Rather, I want to suggest that his position, even though it may strike one as an absurd over exaggeration, it actually represents the logical conclusion and culmination of trends I have depicted. Namely, the trend of the shift towards communitarian principles, the dissolution of the body/individual and the heightened relevance of risks, surveillance and prevention.

Savulescu's suggestion nicely illustrates a trend that has also been observed by legal scholars, namely that the overarching logic of prevention has become something of a catch-phrase in a public atmosphere crippled by a state of fear and insecurity. Preventive and pre-emptive measures are sought in the course of which "civil rights and procedural guarantees are given up."[303]

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[300] Ibid.
[301] Ibid.
[302] See for example: Savulescu, J., Behavioural Genetics: Why Eugenic Selection is Preferable to Enhancement, in Journal of Applied Philosophy, Vol. 23, No. 2, 2006 pp. 157-171
[303] Bárd, P., The principle of availability and the exchange of DNA profiles among Member States: the development of forensic sciences or that of a European Panopticon, Ügyészek Lapja [Prosecutors' Journal], Különszám [Special Edition], Budapest, 2008. pp. 99-108.

In the next section I want to bring one more brief example as to the consequences of the body dissolving in patterns of "objective" information.

Putting the Data Together Again

Even without any of the sophisticated technologies that may emerge in the future surveillance already reaches peak levels with attempts to achieve total information awareness[304] of all suspicious activities and persons. Attempts at extending surveillance measures to human biology are also being tested. One such example is the MALINTENT system developed by the United States Department of Homeland Security, which is designed to scan biological traits such as blood pressure, heart rate, breath rate and non-verbal cues in order to identify harmful intentions.[305](!) MALINTENT is planned to be employed at airports in order to screen out 'harmful other' but can easily be set up at any location and is ready to become operational in 2012. The analogy to an Orwellian thought-police is almost just too obvious to mention. The great advantage of the system is that it works from afar without the scanned person necessarily being aware of the level of inspection she is undergoing at the moment. The goal is to identify biological markers that are unknown to the person bearing them but might reveal some concealed truth. There is increased interest in forms of "soft surveillance" that are non-intrusive and can remain ubiquitous.[306] In this attempt we can truly witness how under the contemporary expansions of panopticism the autonomous, choosing self is dissolved in biological markers which are then reconstructed along the binary axis of "threatening/not-threatening" or some similar distinction which may reveal him as harbouring desires for destruction. The system is greatly reminiscent of the science fiction scenario in the movie *Minority Report* where a special operations agency cracked down on criminals before they had committed any crimes. MALINTENT offers a similar prospect moving the evidence for a crime-to-be-committed to the level of biological markers.

Besides claims by eminent scholars questioning the scientific basis of such an application the American Civil Liberties Union has tried to argue that such biological information comprises sensible and personal data and thus cannot be extracted without consent.[307]

Yet, in light of the previously described developments it seems sadly obvious that the however conceived interests of the community evidently trump the privacy rights of dissolved

[304] See http://www.fas.org/irp/agency/dod/poindexter.html
[305] Barrie, A., Homeland Security Detects Terrorist Threats by Reading Your Mind http://www.foxnews.com/story/0,2933,426485,00.html Last Accessed 21 August 2010
[306] Marx, G., Soft Surveillance: The Growth of Mandatory Volunteerism in Collecting Personal information—"Hey Buddy Can You Spare a DNA?" in Monahan, T., (ed.) Surveillance and Society, 2006. Routledge, New York
[307] Weinberger, S., Airport security: intent to deceive? in: Nature 465, 2010., pp. 412-415.

individuals. Thus it is not so much the act of dissolution that matters but rather those rationalities and sites that have the power to rearrange, reconstruct and put the dispersed data together again.

Summary

In this chapter I have briefly discussed Foucault's notion of biopolitics and the field of inquiry that emerged from his concept of governing. This chapter has shifted the focus of attention from enhancement technologies in a strict sense and detailed some aspects of our current relation to technologies that can rightfully be considered precursors of possible enhancements.

I have tried to show that our current biopolitical landscape is characterized simultaneously by the growing importance of selfhood and individual prudent decision-making in relation to our biological constitution that takes the form of a valuable and manageable asset, but also by tendencies that displace and dissolve the body. This dissolution is true both at the biological level where the body is dissolved in genetic susceptibilities, probabilities, genetic databases and various information patterns and also as an autonomous subject who may no longer occupy a central position in ethical deliberations. Also, I believe that the emphasis on self-monitoring and the constant pre-occupation with our vital status exacerbate the trend of normalizing *the* body.

These tendencies are highly ambiguous and ambivalent bearing liberatory potential in the form of challenging time-worn dichotomies as individuals recognize their growing embeddedness in social and technological relations of increasing complexity. Yet, I believe my examples also highlight a problematic tendency that is implicated by our increasingly cyborgian nature. As the body becomes more porous, dislocated and integrated in technological systems the potentially liberatory effects are captured and subsumed under regimes of performance-enhancement, surveillance, screening and prevention.

Conclusion

This thesis has dealt with the question of humanity's ever increasing merger with technology. It has started with a historical overview of the idea that humans can employ reason, science and technology in order to make themselves better than they are. As I have tried to show this idea has a fairly long and colourful history in the West that is often marked by the most gruesome acts of cruelty imaginable. Judging by this one fact human nature certainly leaves a lot to wish for. This brief historical reconstruction has led me to a discussion of current philosophical positions that are either staunchly opposed or joyously expectant of new technologies that promise even more possibilities of intervention. I have done my best to argue that both of these camps are captivated by a view of technology that is untenable. Some, who identify themselves as humanists fear that technology will dehumanize us and rob us of our essence. Others who – ironically – also call themselves humanists, nevertheless of a trans-, or post- type believe that we will ultimately achieve and realize a centuries old promise, namely the promise of liberation and emancipation. Both of them seem wrong in measuring the extent to which technology has already shaped that what we are and how it is intertwined with whatever we are to become.

Taking this understanding as my starting point I have in the end tried to write about the context, our context within which we are joined with emerging biotechnologies. Admittedly I have laid significantly more emphasis on drawing out the contours of some of the problems and troubling aspects I see. My excuse is that I have constantly found myself in vain of trying to identify sufficient reason for celebration.

Now that I have come to the end I want to raise the question that had been my motivation for writing all along. The short version of the question is: What is to be done?[308] The longer version comes from Foucault: "What is at stake, then, is this: How can the growth of capabilities be disconnected from the intensification of power relations?"[309]

How can emerging technologies be employed in a way that is furthering of human potentials while avoiding most of the dangers I have sketched? And I have only sketched a few. Or rather, how can we aim for a world where the questions of emerging and enhancement technologies are *not* framed by risk, surveillance and prevention? It is in essence a search for effective forms of resistance. Simply "not going along" does not seem to be an option, but I must admit to having found no elaborate and sophisticated answer. Hence I must conclude with expressing my commitment to keep on thinking. Borrowing from second-rate science fiction series:

…to be continued

[308] Gane, N., When We Have Never Been Human, What Is to Be Done?: Interview with Donna Haraway, Theory Culture Society 2006; 23; 135, pp. 135-158

[309] Foucault, M., What is Enlightenment? In Rabinow, P., (ed.) The Foucault Reader, New York, Pantheon Books, 1984. p. 48.

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Deutsche Kurzfassung

Fortschritte im Bereich der Medizin und der Biotechnologie haben vorher als fundamental und solide geltenden Grenzziehungen, wie jene zwischen natürlich-künstlich oder lebendig-tot disloziert und verunsichert. Mit dem Verschwimmen der scharfen Trennung zwischen heilenden, restitutiven Eingriffen und verbessernden, optimierenden Maßnahmen wird es allmählich möglich werden explizit in die „menschliche Natur“ einzugreifen um erwünschte Modifikationen zu unternehmen.

Die Diplomarbeit beschäftigt sich mit dem Fragenkomplex der verbessernden Technologien und besteht aus drei Teilen. Zuerst soll eine historische Rekonstruktion der Idee der technologischen Verbesserung des Menschen gegeben werden. Es handelt sich um eine ideengeschichtliche Skizzierung die vor Augen führen wird, wie umfangreich die Geschichte dieser Idee ist und welche philosophische Strömungen auf gegenwärtige Positionen Einfluss ausgeübt haben. Diese geschichtliche Einführung führt zu den gegenwärtigen Debatten um die Normativität der menschlichen Natur, bzw. der Frage in welchem Verhältnis technologische Manipulationen zum Menschen stehen.

Im zweiten Teil sollen also wichtige Autoren der aktuellen Debatte diskutiert werden, wie Jürgen Habermas und Francis Fukuyama, die von einer starken Normativität der menschlichen Natur ausgehen und meinen, dass die Grenzen der technologischen Verfügbarmachung in der menschlichen Natur liegen. Andererseits kommen auch solche Autoren zum Wort die in neuen technologischen Möglichkeiten eine Chance sehen die Schränke des Menschseins zu durchbrechen und eine helle „posthumane“ Zukunft einzuleiten.

Auf der Grundlage von technikphilosophischen Argumenten wie jene von Donna Haraway und Katherine Hayles versucht die Arbeit die These stark zu machen, dass beide Positionen in der Debatte das ko-konstitutive Verhältnis zwischen Mensch und Technik viel zu wenig beachten. Beide Gruppen fassen Technik im Sinne eines Instruments auf mithilfe dessen die menschliche Natur entweder beschmutzt oder befreit werden kann. Im Gegensatz, scheinen Verbesserungs-, und konvergierenden Technologien andere Fragen aufzuwerfen, wenn wir das Verhältnis komplexer denken.

Im dritten Teil wird Technik weder als Mittel zur Befreiung, noch als eine drohende Form der Instrumentalisierung und Entmenschlichung aufgefasst sondern etwas viel ambivalenteres das sowohl befreiende als auch potentiell unterdrückende Potentiale birgt. Rückgreifend auf Foucault´s Konzept der Biopolitik und der Governmentality Studies werden einige wichtige Züge der gegenwärtigen biopolitischen Landschaft diskutiert. Im Vordergrund stehen die Verallgemeinerung eines Risikodenkens und die wachsende Rolle vor preventiven Maßnahnamen und Screening-Verfahren.

Tabellarischer Lebenslauf

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Sprachkenntnis

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