

## TRANSFORMATIONS

"... is God to Golem as man is to machine?"  
[Norbert Wiener, 1961.]

*"To say that the world can be defined as an object, "X", for scientific operations is to make an absolute of scientific cognition, as if all that has been or is has never had any purpose other than the laboratory. In this way, the "operational" thought becomes absolutely artificial, which we see in cybernetic ideology, where man's fate is derived from a natural information process, itself taken from the models for man's machines. If this way of thinking tackles mankind and history, and if, by pretending to ignore the knowledge we gain through contact and attitudes, it starts to "construct" them from a few abstract characteristics (...) and then man truly becomes the "manipulandum" he believes himself to be, we pass into a cultural condition in which nothing concerning mankind or history is true or false any longer, and into a deep sleep or nightmare from which nothing can arouse us."*

[Maurice Merleau-Ponty, 1960.]

To begin with, let us compare the famous image of Ronald Reagan's speech to the 1984 Republican party convention, which was made from a giant video screen, with disabled actor Christopher Reeve's appearance at the Democratic party convention this year. The enormous picture of Reagan, with the delighted Nancy Reagan as a spectator, was immortalized in the 'eighties as one of the most perfect icons of the period's fashionable theories on the precession of simulacra, hyperreality, and the implosion of the social. [1] But now, little more than a decade later, methods have become radical in a different way. People are no longer satisfied with simulacra. In an age where the giant video screen is becoming standard living-room equipment, Reeve's appearance is an indication of a new fascination with the special cultural perspective, which is written into life-, bio- and information technology of all types: of the cyborg and its "cyborgology." [2]

Reeve, whose most important

"...A Sleep or  
Nightmare from  
which Nothing  
Can Arouse Us"

...

ANDERS MICHELSEN

achievement in Hollywood was his leading role in the "Superman" films, became paralyzed from the neck down in a tragic accident and is only now able to breathe –i.e. survive– through a respiration machine which keeps him alive in a kind of high-tech iron lung. To make his situation even more tragic, but no less explicit, his speech is modulated by the machine and it emerges with a definite rhythm that is generated by the machine's breathing. He can only speak when the machine exhales, and this means that his appearance acquires an extraordinarily mechanical dimension. Reeve's body is not merely a human body "cloned into" a mechanical apparatus, a kind of inverted version of Hans Moravec's renowned idea of downloading consciousness –mind– into a computer; it presents yet again the historical idea of "that intermediate zone, that shadow realm" which unfolds between the dream of humanizing the inhuman and visions of making man's body and being

into a transparent entity through the production of a man-machine. [3]

The ideas of simulating man, simulating machines, androids and automata are almost as old as civilization. [4] From Engidu, the monster of primeval mythology, which was humanized by Gilgamesh only to sacrifice its life for him later, via the Hebrew legend of Golem, to the automata of the Baroque and the Enlightenment, the Frankensteins of the Romantic age and our own time's replicants, up to the present prospects of "AL" (artificial life), we witness an "android epistemology" [5], or rather a series of tales that "constitute a multi-layered system of metaphorical and material relays, through which 'life,' 'nature' and 'that which is human' are redefined" [6]; and these systems of meaning and technological construction appear not least of all to be impelled by a hope for the final convergence of man and automaton. This is a hope that seems to be shared by science and culture.

A significant part of the population (especially in the western hemisphere) can already be considered to be man-machines, on the grounds of their vital, built-in "relays," such as pacemakers. [7] At the same time, a global "robot population" of 500.000 [8] is spoken of without the batting of an eyelid in many forums. And, in Reeve's case, the impact of such assertions and tales is so much the greater, precisely because he seems to appear at the intersection of life and death, death and automaton, automaton and man, where the transition between human and non-human becomes lost in a new type of virtuality, where the interface vanishes in a mysterious no-man's-land that exists between apparatus and humanity. [9] Here, tales of the man-machine are being

linked to the entire arsenal of complex modern technology that has come to play an ever-greater part, especially since the mid-twentieth century.

Furthermore, the fact that Reeve has made himself into a spokesman for socio-political humanism in today's USA, and was celebrated as such at the Democratic convention, fits in only too well with these latter-day tales of technical and material relays for life –tales which are written into the complex relationships between body and biology, power and *techne*, which Michel Foucault referred to as instances of “biopower.” One thing which nobody seems to notice, but which we can hardly ignore if we reflect more deeply, is that this unfortunate disability has made Reeve so popular precisely because it enables him to advance the case of not only man, but also of machines. Reeve has survived, but our fascination is not engaged solely by his struggle for life: it is equally concerned with the very fact that such survival is possible, that his disabled body still speaks to us, albeit from another place, an “*anderswo*,” through the machine, and an “*anderswerden*,” from the machine, in the rhythm and modality dictated by the creaking feedback of the lung apparatus.

Christopher Reeve is a triumph of medicine and life-support technologies, and his body –which in happier days projected the illusion of the *Super-man*– has been transformed into an apparatus, the integrity of which is underwritten by an artificial system, and the function of which appears to be perfect when Reeve charmingly and earnestly expresses himself, involuntarily speaking in a kind of machine code, almost digitally, “on-off,” “on-off,” one might be tempted to say. With great elegance, the feedback of the machine also becomes “feedforward,” because Reeve must, *a priori*, constantly take into account the limits of the machine in his behavior. When the Democratic convention celebrated Reeve, it also celebrated a victory for the medical variety of constructivist technology which –since

the ‘sixties– has taken form as the vision of the cyborg –the cybernetic organism.

The concept of the cyborg was created in the wake of the great breakthrough of space technology in the ‘fifties and ‘sixties and, of course, in the context of the wealth of narrative and scientific relays that were actualized in the fields of science and culture. The term was coined by two NASA doctors –Manfred E. Clynes and Nathan S. Kline– whose article, “Cyborgs and Space” (1960) was subtitled “Altering man’s bodily functions to meet the requirements of extraterrestrial environments would be more logical than providing an earthly environment for him in space. Artifact-organism systems which would extend man’s unconscious self-regulatory controls are one possibility.” [10] This article formulated, for the first time, a specific android epistemology that targeted the human body. With a single blow, Clynes and Kline not only launched the Golem myths into interplanetary space; they also brought its specific technological planning far closer to the modernized Golem myths long cultivated by science fiction, movies and diverse inventor types. The cyborg was prepared (if not named) and, with the birth of cybernetic thinking at the end of World War Two, it seemed that the route had been opened to a dynamic instrument which could approach life and machine, the organic and the mechanical, the Golem myths and mankind.

According to Clynes and Kline, the cyborg state would “free” man, so that he would be able to escape from the restrictions to which he would otherwise be subject in an extraterrestrial environment: “*If man attempts partial adaptation to space conditions, instead of insisting on carrying his whole environment along with him, a number of new possibilities appear. One is then led to think about the incorporation of integral exogenous devices (into man’s body, A. M.) to bring about the biological changes which might be necessary in man’s homeostatic*

*mechanisms to allow him to live in space qua natura.*” [11] The key words here are *qua natura*, since the concept of adaptation is not only directed towards man’s metamorphosis but, in reality, has also been inverted to become the incorporation of systems into man.

Man’s homeostatic mechanisms thus become a new and different field in which endogenous and exogenous parameters seem to converge, without it being possible for man to be absorbed without trace into the technology, and without the technology being incorporated completely into man. The relationship between man and machine is thus asymptotic. Although man can exist in space in the form of a cybernetic organism, this cybernetic organism is, from the outset, compelled to subordinate itself to certain irreducible attributes of the organic, without which it would not be reasonable to speak of homeostasis. It is a question of a displaced equilibrium. It is exactly this question that Clynes ponders in a later article: “*There is a strange technological imbalance between man’s development of his tools and machines for the penetration of the nature of space, and his lack of progress in cyborg technology.*” [12] And, in an interview many years after the birth of the first ideas, Clynes speaks of five stages in the development of the cyborg, according to which, it is precisely the problem of that which is human –the body’s opposition– that is the crucial issue, but now formulated as a question of how man’s emotional structure can be “cyberneticized.” [13]

The first stage is concerned with the adaptation of the physiognomy, for instance, to the extraterrestrial “environment.” The second stage poses the question of whether man can adapt himself emotionally to the cyborg state. The third stage, which Clynes believes can be attained immediately, should be aimed at manipulating those processes within the brain that generate emotional states, in part with the aid of genetic technology. The fifth and final stage

concerns a fully-manipulated human body, i.e. a fully-developed cyborg, which is attained through manipulation of the molecular structures in the brain, manipulation which will, in turn, provide the final solution to the emotional problem. Nonetheless, a human *gestalt* continues to exist within this final manipulandum: *“Eventually, millennia from now, our brains may perhaps exist for thousands of years or more, rich in illusion, concentrated and powerful, with multiple sensors, and may not really need the body for its existence. The pleasures of the body, and striving of the spirit, learning, creating and inquiring and communicating could be available without the body ... as they are to us in dreams today.”* [14]

2

These visions of the cybernetic organism transport the man-machine from its shadow realm into the transparency of techno-science. In 1948, against the background of the advances in servo-mechanical, electronic and information technology made during World War II, Norbert Wiener formulated the goals of a scientific discipline based on the entire field of *“control and communication theory, whether in the machine or in the animal...”* This field, he called Cybernetics[15]: *“... the many automata of the present age are coupled to the outside world both for the reception of impressions and for the performance of actions. They contain sense organs, effectors, and the equivalent of a nervous system to integrate the transfer of information from the one to the other. They lend themselves very well to description in physiological terms. It is scarcely a miracle that they can be subsumed under one theory with the mechanisms of physiology.”* [16]

For Wiener, a decisive characteristic of the cybernetic organism, is that its function is related to a flow of input data. Input-output is based on a well-defined *“past-future*

*order,”* [17] and an automaton must be able to generate its output *“for a whole class of inputs.”* [18] It must be able to change its state dynamically, a necessity which conflicts with the view of the automaton as a conservative physical system. According to Wiener, it is precisely the latter factor that makes it possible to consider automaton and body as similarly formed, that is, as existing in a vitalistic paradigm (cf. Henri Bergson) but, as Wiener stresses, this is an altered vitalism that is removed from any form of metaphysics. [19] In place of a dichotomy between vitalism and mechanism, we must develop a new concept of the material, which rephrases these *“badly posed questions,”* [20] and places them squarely within the framework of a general theory of cybernetics, based on dynamic control in organic and mechanical *“automata.”*

The cyborg is thus more than a concrete object: it is a model, a technological structure which, according to Hables Gray et al., lacks a well-defined technological object character, [21] but which must be considered a problem complex that refers to a *“full range of intimate organic-machinic relations.”* [22] A variety of cyborg technologies are being developed from work done on military, medical, entertainment and industrial applications of the cybernetic organism. These include “restorative” technologies in the form of prosthetics, pacemakers, etc., “normalizing” technologies which normalize physiological deviations, for instance, of the disabled, “extended” technological applications related to military or industrial use and, finally, “reconfiguring” technology, in which “... posthuman creatures equal to but different than humans...” [24] are created, creatures whose function can be compared to the state of an interactor in cyberspace, who interacts with peers or with a number of artificial agents of different types “or, in the future, the type of modifications proto-humans will undergo to live in space or under the sea having given up the comforts of

terrestrial existence ....” [26] In a broader sense, the cybernetic organism refers us to the android epistemology which is written into the modernist history of science, from Copernicus, via Darwin and Freud, up to Wiener and so forth. Characteristic of this history, according to Hables Gray et al., is its elimination of the differences –or “discontinuities”– between the cosmos and the individual, man and animal, man and the unconscious and finally, in cybernetics, between man and machine. To the extent that nature and machine can be united in a paradigm written on the basis of the abolition of the “fourth discontinuity,” we are able to discern “the sign of the cyborg,” the posthuman and the transhuman. [28]

According to George Canguilhem, this century’s history of the relationship between the mechanical and the organic can be written as the adaptation of technology to allow man to live in “continuity with life.” [29] While early modernism strove to define man as a machine, this approach is being reversed in the present century. Although Canguilhem asserts that the machine has its origins in pre-modern magic, the development of a rationalizing technology means that this origin is being forgotten in favor of a new mechanical order. [30] The rational machine introduces the possibility of a partner-race between man and science, in which the technical and scientific elements interchange. It was against this background that the beginning of the century witnessed the start of a new partner-race between the organic and the mechanical, a race which has become a structural trait of technology. The gradual introduction (by industrialism) of an ever-more complex mechanical element, proceeded parallel to a similarly expanding anthropological understanding of technology as the systematic expansion of human life processes. [31] Increasingly comprehensive studies of the functioning body in production processes, such as F. W. Taylor’s investigations into the

possibility of mathematically quantifying the body's motor functions [32], resulted in the realization that processes that seem mechanically superfluous are, in reality, necessary to the body; "... the systematic examination of certain physiological, psychotechnological and even some psychological conditions ... finally culminated in a reversal ... in which technology would adapt machines to the human body. [33]

Although, from a Cartesian viewpoint, the organism is mechanical, the opposite viewpoint emerged during the course of the nineteenth and twentieth centuries, i.e. that the machine must be adapted to the organic, that it must be adapted to man's anthropological characteristics, as Canguilhem has suggested.

### 3

We can thus consider three parameters that are important to the invention of the cyborg: 1) The transformation of the android epistemology, from its existence in the man-machine shadow realm, to the concept of the cybernetic organism; 2) The increasingly complex interchange between the organic and the mechanical in science and technology, mediated, to an extent, by information technology and its paradigms; 3) The increasingly comprehensive social and cultural implications of these ideas (even if, in many cases, they remain just ideas, "metaphorical relays"). Although this epistemological history is obviously interesting in itself, the decisive aspects in our context will be the trend towards a new definition of technology that is growing out of the increasingly complex relationship between technology and non-technology (rather than the primarily organic and mechanical) as well as the purely quantitative aspects of this trend –realized technology.

It is here that we can find the background of the cyborg's significance for art and culture, the fascination with what Scott Bukatman calls the "terminal identity," "a space of accommodation to

an intensively technological existence." [34] This fascination is formulated especially radically by cyberfeminists such as Donna Haraway, in her famous "Cyborg Manifesto" [35], and by cyborg activists such as Sandy Stone [36], in whose thought the cyborg does not simply figure as the adequate norm for identity in cyberspace, but also turns itself towards the world "outside" as a new critical instrument. Stone considers the cyborg to be a mediator in the service of the transsexual identity of the body, behaving as a peculiar mirror (screen) in the on-going conflict between bodily identity and sociality. [37] According to Stone, the cyborg becomes an index for gauging the natural body's illusory naturalness, its invisibility in social law, which customarily represents the relationship between the monstrous and the natural. This law is forced into crisis by the cyborg and transsexual activism, both of which are schisms between two types of lived nature, which is not only the product of social sexuality and a body, but also refers to an ambiguous physicality which is both lived and imagined, and: "... which expresses the default subject position in the virtual age, and which by its enunciation calls into question not simply the masquerade of gender but the facticity of social identity tout court." [38]

What Canguilhem saw as an historical and epistemological "reconciliation" between the organic and the mechanical, is given a special twist here in the new, virtual, cybernetic and informationized field of ambiguous social "robotics," which appears neither to maintain the distinction between body and technology, nor between nature and culture. The asymptotic convergence of the organic and the mechanical, which was based on certain irreducible attributes of the organic and the mechanical, is shifted into something which, for want of a better expression, could be called a virtual field –in the technological, cultural, social, economic and political sense– generated by and

expressed through the ever-more comprehensive complex of technologies that keep us alive, from traffic lights and refrigerators to pacemakers and biotechnology. Our "cyberbodies" are neither neutral prosthetics nor limited to our imaginations –on the contrary, they are a result of a particular style of interaction with the world and a technological hallmark stamped on matter, time and space, which expresses the human's destiny as "the artificial in nature," as the German philosopher Wolfgang Schirmacher has put it. [39] But, this artificiality is not the absolutely artificial: it is rooted in the world. It is the translation of man and his destiny into an intermediate field where "... on this side of the pure subject and the pure object, something like a third dimension will be opening up, where our activity and passivity, our autonomy and our dependence, no longer contradict one another. [40]

Thus, we are mistaken if we understand the cybernetic organism as the transformation of man into a pure construct, as the effect of mutual transparency between machine and organism. It is not a question of resolving the mystery of the man-machine, of illuminating man's "black box," but instead, of the fundamental asymptotic convergence of the mechanical and the organic. The cyborg is not an artificial construction; neither is it a mechanical parasite or a rejection of life, but rather a virtual field in which the mechanical and the organic simultaneously undergo metamorphosis and maintain opposition. The cyborg will constantly retain an irreducible residue of biological and mechanical "flesh," although this may tend to a kind of borderline determination. From within, from its virtual field, it will formulate this boundary, this fundamental barrier, difference, opposition, which refers not only to a specific turn in our comprehension of anthropology (as discussed by Schirmacher), but to a new concept of techne, written into the functional,

symbolic and imaginary utilization of technology that characterizes post-industrial society. It is at once a specific technology, of which Reeve's state is an expression, and a manifestation of new post-industrial dynamics which we see, for instance, in the informationized economy's trade in futures and derivatives. This is a peculiar form of modernized, instrumental Herrschaft, from within which man observes, examines and transforms himself. The cyborg is neither freedom, nor its opposite. It leaves both concepts open.

The cyborg is an expression of the fact that the instrumental, hermeneutic and phenomenological determinations of technology to which we have been accustomed, are being supplemented by a special determination of the technological, one which cuts across life and techne, body and machine –what Ezio Manzini has called the sedimentation of technology as an artificial ecology. [41] This sedimentary aspect of technology (its accumulation and extensional logic, as well as the complex interrelations between the technical and the non-technical –from biology, via the dynamic systems of AL, to notions of the cyborg as a social identity and representational field), ushers in, in the words of N. Katherine Hayles, a new relationship between science and the imaginary: “they speak, if not the same language, then from the same place ....” [42] The cyborg will therefore retain a fundamentally phenomenological dimension of being as meaning, despite, or rather because of, its asymptotic convergence and its expanding virtuality.

So, we can join our voices with Merleau-Ponty's, in his criticism of a blind cybernetics that leads us “... into a deep sleep or nightmare from which nothing can arouse us.” But we can do this precisely because we believe that the convergence which Norbert Wiener formulated as a theory of information and control, was based on a structural similitude in the organic and the mechanical, a form that did not exclude

the organic and the mechanical self. To paraphrase another idea of Merleau-Ponty [42], the cyborg is a little more a little less machine in the same way that it is always a little more a little less man. That is why it does not show us the materialized dream of the dark man-machine. Instead, it shows us a world in which man exists and in which he is compelled to learn to know himself....

- 
- [1] cf. Wallis, Brian (editor). *Art after Modernism*. p. 260.
- [2] cf. Hables Gray et al (editors). *The Cyborg Handbook*. (Routledge, 1995).
- [3] Thau, Carsten. “*Menneske-automaten. Levende statuer mellem barok og romantik*” (English translation of Danish title = “The man-machine automaton. Living statues between the Baroque and the Romantic”). *Kritik* 105, Gyldendal, Copenhagen, p. 46, ff., p. 47 (published in Danish).
- [4] Ibid.
- [5] cf. Kenneth M. Ford et al., (ed.), *Android Epistemologi*, AAAI Press/MIT Press, 1995.
- [6] N. Katherine Hayles, “*Fortællinger om kunstigt liv/Narratives of Artificial Life*”, in Anders Michelsen & Frederik Stjernfelt (eds.), *Billeder fra det fjerne. Videnskabelig visualisering –en antologi/Images from Afar. Scientific Visualization– an anthology*, Akademisk Forlag, Copenhagen, 1996, p. 50/180.
- [7] Donna Haraway, Chris Hables Gray et. al., amongst others, point out that the concept of the cyborg is, of course, extremely broad if at all conceivable. Built-in, vital machine-parts are included in our definitions of man-machine “hybrids.”
- [8] Joe Engelberger, “*Die Evolution der Roboter/Watching Robot Evolution*,” in Gerfried Stocker et. al., (hrsg./ed.), *Memesis, The Future of Evolution*, Springer Wien New York, 1996, p. 156, ff., p. 157.
- [9] cf. the inventor of virtual reality, Scott S. Fisher, “*Wenn das Interface im Virtuellen verschwindet*,” in Manfred Waffender (hrsg.), *Cyberspace, Ausflüge in virtuelle Wirklichkeiten, Rowohlt, Reinbek beim Hamburg*, 1991.
- [10] Manfred E. Clynes and Nathan S. Kline, op. cit., p. 29, ff.
- [11] Ibid., p. 30.
- [12] Manfred E. Clynes, “*Cyborg II: Sentic Space Travel*”, in Hables Gray et al., (ed.), op. cit., p. 35, ff., p. 37.
- [13] Chris Hables Gray, “An Interview with Manfred E. Clynes”, in Hables Gray et al., (ed.), op. cit., p. 43, ff.
- [14] Ibid, p. 52.
- [15] Norbert Wiener, *Cybernetics: or Control and Communication in the Animal and the Machine*, The MIT Press, 1991 (1948), p. 11.
- [16] Ibid. p. 43.
- [17] Ibid.
- [18] Ibid.
- [19] Ibid, p. 44
- [20] Ibid.
- [21] Chris Hables Gray et. al., “*Cyborgology*”, in Chris Hables Gray et. al., (ed.), op. cit., p. 2.
- [22] Ibid., p. 3.
- [23] Ibid.
- [24] Ibid.
- [25] Ibid.
- [26] Ibid., pp. 5-6.
- [27] Ibid.
- [28] Georges Canguilhem, *La connaissance de la vie*, Librairie Philosophique J. Vrin, 1992, p. 101, ff., p. 127. Also see excerpts of the American translation, in Jonathan Crary et al., (ed.), *Incorporations, Zone 6*, New York, 1992.
- [29] Ibid., pp. 125-126.
- [30] Ibid., p. 126.
- [31] Ibid.
- [32] Ibid.
- [33] Scott Bukatman, *Terminal Identity. The Virtual Subject in Postmodern Science Fiction*, Duke University Press, 1993, p. 10.
- [34] Donna Haraway, “*The Cyborg Manifesto: Science, Technology and Socialist-Feminism in the Late Twentieth Century*,” in *Simians, Cyborgs and Women. The Reinvention of Nature*, Free Associations Books, 1991, p. 149, ff.
- [35] Allucquère Rosanne Stone, *The War of Desire and Technology at the Close of The Mechanical Age*, The MIT Press, 1996.
- [36] Ibid., pp. 180-181.
- [37] Ibid., p. 181.
- [38] cf. Wolfgang Schirmacher, “*Netzwelt von innen: Eine Medienphilosophie des Zwischen*”, lecture at the conference *Interface 3, Internationales Symposium, Hamburg 1.-3.11.1995*.
- [39] Maurice Merleau-Ponty, *Titres et travaux*, p. 5, cit.eft, Bernhard Waldenfels, *In den Netzen der Lebenswelt, Suhrkamp Verlag Frankfurt am Main*, 1985, p. 56.
- [40] cf. Ezio Manzini, *Artefacts. Vers une Nouvelle écologie de l'environnement artificiel*, Les Essais, Centre Georges Pompidou, 1991.
- [41] N.Katherine Hayles, “*Kunstigt liv og den litterære kultur*” (English translation of Danish title = “Artificial Life and Literary Culture”), in *Kritik* 109, Gyldendal, Copenhagen, 1994, p. 26 (published in Danish).
- [42] cf. Maurice Merleau-Ponty, *In Praise of Philosophy and Other Essays*, Northwestern University Press 1963, p.3ff., pp. 63-64, (French: *Éloge de la philosophie*, Paris 1953).

This text was first published in Danish and English in Elisabeth Delin Hansen(ed), “*Nemo. The Dream of New Man.*”, Nikolaj, Copenhagen 1996. The text was translated from Danish into English by Jason King, Copenhagen.