

# **Ethics, Science and Technology**

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## **Ethics of Science and « Converging Technologies » (1<sup>st</sup> part)**

The ethical debates that concerns politics and the public at large are greatly influenced by scientific and technological progress. Every ethics of science has in this respect to look for clarity about the fundamental link between technology and modern science.

### **Ethics and technological progress**

Alongside information technology biology is the leading science nowadays. As their presupposition however, applications of biosciences – also called « life sciences » - have a totally technical understanding of biology. Technical thinking determines not only the applications of modern biological knowledge, but already fundamental research.

The same is true for new developments in the field of medicine. Saving, sustaining and prolonging life as well as cure is more and more understood as a technical problem. Physicians become anthroprotechnicians.

### **Converging technologies**

There is a new step in transforming medicine and life sciences into technology through the « converging technologies ». These represent a combination of nano-, bio-, information- and cognition technologies known as NBIC technologies.

« Converging technologies » allow for totally new combinations of biological and non biological material. They are expected to lead to new medical applications, e.g. totally new methods of diagnosis and artificial implants, the use of nano particles for treating tumour cells or the use of chip technology in neurosurgery. Conversely, bacteria can be transformed into data conveyors in the field of information technology.

The transfer of organic molecules into artificial tissues could possibly revolutionize science of materials, so that the borders between living and non living material, between brain and computer, between organic carbon substance and non organic silicon combinations would be blurred.

Bibliography : Mihail C. Roco/William S. Bainbridge (Ed.) Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology and Cognitive Science, Dordrecht 2003

## **New ethical challenges**

Converging technologies open totally new possibilities to interfere into human and animal life. This concerns not only the beginning and the end of life, but the whole duration of life. In this context, basic human rights are at stake, like the right to life, the right to physical and mental integrity, the right to protection of private life and the right to health. The borders between cure and optimisation of human nature, between illness and health become to become unclear, even more than so far.

The use of nanotechnology in neuromedicine touches the issue of identity, of personhood (personality ?) and changes in personhood ((personality ?) – while some illnesses can also change the personality (e.g. Alzheimer). Where are the limits between therapy and manipulation ? Who decides on that ?

## **Evaluation of consequences of technology and related research are needed**

The general trend of medicine is towards a multioptional society. Where are the limits of the autonomy of patients ? Alongside the right to be cured should there also be a right to optimise one's own nature, e.g. the performance of one's memory or eyesight ? What would be the costs and usefulness of the new technologies ? A Swiss study expects no decrease of health expenditures in the middle-term. Nanotechnology would also rather reinforce the trend towards two-class medicine.

Converging technologies can be of civil and military use as well. Research in this field is always « dual research ». What are the consequences in respect of ethical evaluation ? In addition there are a series of new safety problems, ranging from data protection to possible forms of « nano pollution », i.e. the non desired contamination of persons and environment through nano particles. Therefore there will be a need for wide-ranging evaluation of consequences of technology and for related research.

Bibliography : Walter Baumgartner/barbara Jäckli/Bernhard Schmithüsen/Felix Weber, Nanotechnologie in der Medizin (TA 47/2003), Bern 2003

## **Swiss Center for Evaluation of consequences of technology**

### **Converging technologies and EU policy**

Many discussions around technical possibilities for innovation mainly sounds like science fiction. However there is a need to tackle the issue in a prospective and proactive way. This has already been recognised by the EU. From 14 to 15 September a high-level expert conference took place in Brussels on the theme of « Converging Technologies for a Diverse Europe ».

Converging technologies will be in future an important field of European research policy. An appropriate financing of such research is probably part of the top themes for the discussions around the upcoming 7<sup>th</sup> Framework Programme of the EU.

It has to be incidentally noted that Austria will preside over the EU when negotiations on the 7<sup>th</sup> Framework Programme will have to be finalised. Therefore the Austrian Bioethics

Committee has already put the topic of converging technologies on its agenda. We urgently need a multidisciplinary scientific and public debate on these issues on a national and pan-European scale as well.

## **Information about the conference « Converging Technologies for a Diverse Europe »**

### **What is (still) nature ?**

Biotechnological progress leads to a deep change of our perception of nature of what is natural, as well as of the image of the human being and of the self-understanding of biology and medicine. There is apparently a need for a comprehensive ethics of life that recognises the tight interconnection between biology, medicine and technology.

The philosopher Helmut Plessner (1982-1985) has already described human existence as a natural artefact. With the Converging Technologies, there is a new step towards natural artificiality.

Nature is always a conceptual and intellectual-theoretical construction. The linguistic sign « nature » always receives its meaning only through diverse scientific and cultural interpretative processes. Throughout history of technology nature however has also become gradually a technical construction. The telos (finality) of nature went gradually from having a meaning in itself to being meant for human intervention.

The reflection about basic questions linked to views of humanity and the world has therefore to take a stand on every single issue raised by applied ethics, i.e. material ethics, in the discussions on the nature of modern technology and the vision of life determined by technology.

### **Topical ethics**

Indeed, there is a need to develop a « topical » ethics, i.e. an ethics that starts from typical situations thanks to which the applications of Converging Technologies and their goals have to be discussed. Too rapidly formulated judgments in favour or against the new technologies would miss the complexity of scientific developments and their consequences in society.

A « topical » ethics looks into processes. It does not operate with final views about what nature and values are, but with rules and procedures that allow for finding ethical and legal solutions, despite diverging ideas. The fundamental questions about human nature and the nature of technology must also be discussed in concrete situations.

### **The nature of technology**

According to the philosopher Martin Heidegger the nature of technology determines modern science from its very beginning onwards.. Modern technology does not follow science as a mere application, but already determines the latter. Scientific experimentation uses technical devices and instruments that transform nature in such a way that it becomes ready for exact measurements.

In the sense of the famous phrase of Galileo Galilei modern science consists of measuring what can be measured, and transforming what cannot be measured into something which can be measured. The calculating look at nature, i.e. also the “mathematisation” of natural science, which has declared by the logical positivism criteria of all sciences, is only possible through technology and technological progress.

The invention of the telescope to explore the macrocosmos and the invention of the microscope to explore the microcosmos lead (have led) to the replacement of a pre-modern philosophical speculation on nature by a a technical kind of speculation. At the place of observation of nature only with one’s eyes, there comes (has come) observation through technical instruments.

### **Technoethics**

Because the nature of modern technology determines all scientific disciplines, the current debate on ethics in sciences mainly concentrates on issues linked to technoethics.

The concept means two things. First it is understood as an ethics for technology, seeking to evaluate the consequences of technology. In this sense, technoethics is part of applied ethics or field-related ethics.

Second, technoethics may also be understood more fundamentally as an ethics determined by the nature of technology. In this sense, technoethics is not looking for external moral or ethical evaluation of technology. It discusses « the possibility of an internal moral foundation grounded on the nature of technology » (Peter Fischer).

#### **Bibliography :**

Peter Fischer, Philosophie der Technik (UTB 2504), München 2004 ;

Hans Lenk/Günter Ropohl (Hg.), Technik und Ethik, 2. Aufl. Stuttgart 1993 ;

Günter Ropohl, Technikethik, in : Annemarie Pieper/Urs Thurnherr (Hg.), Angewandte Ethik. Eine Einführung, München 1998, S. 264-287

### **Uneasiness in civilisation**

The appeal to a renewal of ethics or even to a new ethics expresses a general uneasiness in civilisation (Sigmund Freud). A current opinion is that it is the duty of ethics and morals to indicate the limits of science and technology and to build up clear barriers to scientific frenzy of feasibility.

Nevertheless as a science ethics finds itself in the whirlpool of scientific thinking. Already in 1992 the philosopher Walter Schulz stated in his book « Philosophie in der veränderten Welt » : « The “scientification” has reached the field of anthropology, so that questions, once pertaining to the ethical field, are now dealt with by specific scientists, in particular specialists in behaviour, psychology and sociology ».

One could easily add that it belongs to the « dialectic of enlightenment » (Max Horkheimer/Theodor Adorno), that it has brought about the general domination by the new technologies, i.e. by this technocracy that first provoked most of the ethical dilemmas, for which there is nowadays an urgent need to find solutions. Even the socially critical thinkers towards enlightenment participate in the modern « trend towards technology ».

Bibliography :

Walter Schulz, Philosophie in der veränderten Welt, Pfullingen 1972

### **Ethics of science and « converging technologies » (2<sup>nd</sup> part)**

Issues of research ethics finally lead us to the question of the vision of humanity that determines our conscience and action, because every ethics is applied anthropology.

#### **Ethics as applied Anthropology**

Even if today there is an increasing justified demand to respecting, not only the vital interests of the human beings, but also the intrinsic value and the right to live of animals and finally of the whole nature which surrounds us, it remains true that, in the field of science and ethics, human beings still are, at least theoretically, the measure of everything.

Only human beings are the subject, and only they may ask themselves explicitly moral questions. At least from an epistemological point of view, it is impossible to avoid a kind of anthropocentrism, which has been so far superficially denounced.

#### **Visions of humanity and pluralistic society**

Another question is whether our traditional vision of humanity is still adapted to the challenges of scientific progress, all the more that there is no single vision of humanity in a pluralistic society. The philosophical and societal consequences of modern medicine are more far-reaching than e.g. the currently existing possibilities of biomedicine. Fundamental ideas of traditional Western culture and of a vision of humanity influenced by Christianity risk to disappear.

However, it has to be noted that the stereotyped speech about *the* vision of humanity, e.g. the Christian one, is a non-historical construction. Not only do the Christian or humanistic visions of humanity not exist in this form, but both have gone – and still go – through processes of transformation, which are, among other things, the result of the debates with enlightenment, with the results and progress of modern natural and human sciences, as well as with changes in society, e.g. the passage from an agrarian to an industrial society and further to a service- and knowledge-based post industrial society. In addition, there are significant differences, not only in dogmatic, but also in anthropological questions, between the different Christian confessions relating e.g. to the concepts of human freedom and sin.

#### **Cultural and religious hermeneutical processes**

Visions of humanity are the result of complex cultural and religious hermeneutical processes. The question is therefore one-sidedly posed, when it is asked for instance how long technological progress is (still) compatible with a specific vision of humanity.

In effect, it has also to be asked in how far a given philosophical or religious tradition is able to integrate historical changes in a productive way and to interpret transmitted traditional elements in a new way, so that to still allow also people of the present time to interpret their own life in contemporary circumstances in a meaningful way.

A specific anthropology has also always certainly a critical function from an ethical perspective. Criticism and hermeneutics are mutually in a dialectical relationship. This is sometimes neglected, for instance by Hans Jonas in his book «Prinzip Verantwortung» (1979), when he formulates the idea of a «heuristic of fear».

### **Human beings and technology**

The same is true for a philosophy or theology of technology. The position of human beings in nature is characterized by technical adjustments, which diverge significantly from animal behaviour. Human technology is not limited to the use of some helpful tools, what may also be observed with animals. The use of technology happens much more on the basis of aims and methods that use the idea of causality in a systematic way (Ernst Cassirer).

Even if being a human being does not simply mean having technology, «in their specific position, human beings are human beings because they have technology. Technology is therefore a constitutive determination of the being of human beings» (Peter Fischer). Every ethics of science and bioethics should also take this element into account.

This does certainly not mean that technological progress should be accepted without criticism. In the tension between hermeneutics and criticism there is much more the need to consider the ambivalence of this phenomenal process.

### **Homo faber**

«Homo faber» is the title of a novel by Max Frisch published in 1957. Its main character is a technician whose rational vision of the world falls to pieces through tragic complications. In other 20<sup>th</sup> century novels too there are characters who are engineers e.g. Ulrich, the man without qualities in the novel by Robert Musil with the same title.

The engineer is the symbol of modern times. It belongs to the ambivalence of technology that it can, as an anonymous power, gain domination over Homo faber or that it leads to domination of human beings over the other human beings. This danger has already been discussed in many ways in philosophy throughout the 20<sup>th</sup> century. Biotechnology and converging technologies lead to further deep changes of visions of humanity and of the world.

### **Hermeneutics and criticism of technology**

The main question linked to criticism of technology is : where are the limits of what should be ethically allowed, beyond which the use of science and technology leads to inhumanity ? The hermeneutical problem of technology is rather : what does it mean in terms of their self-understanding by human beings, if they have to understand themselves in future as products produced through technology by other human beings ?

Under such circumstances how can the concept of human dignity still be filled with meaning ? Or what should still mean the idea of being made in the image of God stemming from the Jewish and Christian tradition ? Will human beings, in the midst of the technological accompanying conditions of the process of their becoming human beings, still a way to personal faith and belief that it is finally God that created them “together with all creatures” (Luther) ?

## **Modern technology and religious interpretation of the world**

If there is a claim to truth for the biblical belief in creation, it must still be valid under the conditions of modern biomedicine. If the conviction about human beings being created by and made in the image of God should disappear on principle because of the use of certain reproductive or converging technologies, then this would mean it was nothing more than an obsolete myth in the pejorative sense.

If, on the contrary, the discourse about human beings created by and made in the image of God expresses an understanding of human existence opened and revealed through faith, then this must also still be a present possibility of human self-understanding. The use of technological means as such in modern medicine, including the reproductive one, represents clearly new hermeneutical challenges for the Christian doctrine of creation and anthropology. However, it does not discredit on principle the significance of ones' own existence as being created by God.

## **Cultural fight within sciences ?**

Clearly, one of the central present scientific and ethical challenges lies in new forms of a naturalistic monism and its related utilitarianism. Naturalistic interpretations of the spirit, of the theory of knowledge and of ethics, even of culture in general and also of religion – see the discussions by neurobiology – lead to the domination of natural sciences and to the increased marginalisation of human sciences.

The perspective of societal and economic usefulness is also appealing to politics and to related steps policies linked to sciences. Ethics in science has not the right to limit itself to discussing issues of applied ethics in the field of research. It has also and above all to elaborate the basis for the inter-disciplinary discussion between natural and human sciences. If, on the contrary, natural and human sciences play one against the other, this will be not only detrimental for both, but also for society as a whole.

Human sciences have indeed reasons to be self-critical, because the often deplored ignorance in human sciences by the natural sciences represents somehow the receipt the cultivated dominance of human sciences over natural sciences from the 19<sup>th</sup> century onwards. There is therefore some irony in the present situation as to their dialogue for both scientific cultures.

## **Ethos of science and educational duty**

Nevertheless : the development of an ethos, including in science, is linked to education of the whole person and of ongoing training, not only in the knowledge. This includes the religious dimension of our being human beings. Without a basic reflection on our belonging to creation, including our being born and being mortal, we will be hardly in a position to develop an ethos of respect for all creatures.

In a society that sees itself only as an information and knowledge-based society, ethics has in principle resigned, even there is a lot a talk about it. Concern about education and not only about knowledge should belong to the virtues of every researcher. When we discuss about ethics of science and technology nowadays, it is not least because this virtue is apparently no longer self-evident.