

# Science and Technology Today: What Ethics for the Future?

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«Superior intelligence is an error of the evolution, incapable to survive for not more than a short moment of the history of the evolution»

[ERNST MAYR]

The challenges the humanity is facing – the excessive economic power, still more potential tools the science is creating make necessary large social discussion about ethic base of the knowledge, scientific activity, and the relation between the science and the power.

1. First of all, the science is not, for its strict quantitative method, a superior form of knowledge. It is one of many forms of knowledge. Each form has its environment and specific character but the science is not superior of poetry or philosophy, the quantitative approach is not superior of the qualitative or esthetical one. Every approach is, because of their environment and aims, appropriate and irreplaceable. It is very dangerous to claim that quantitative approach is applicable in whatever discipline to make it more “strict” (the quality of life contains essentially qualitative aspects. And the troubles due to misuse of Intelligence Quotient are well known).

Besides, the science is a product of history, by people who worked in historically determinate situations and were involved in the social and cultural affairs of the period in which they lived.

The relationship between the science and technology has also changed profoundly in the historic situation. At the origin of the industrial revolution, with the inventions that the new born middle class introduced to the aim of profit and work exploitation (the steam machine was invented by a forge man), new phenomenon were discovered. The science developed in a subordinate way to explain technological invention. Just in the second phase of the industrialization, at the end of the 19<sup>th</sup> century, the science reached the level of the autonomous methodology, which enabled it to become the guide for the innovation (the electromagnetic waves were predicted by Maxwell’s theory of electric and magnetic phenomenon).

2. Technology has created a second artificial nature which is separated from the nature. Artificial products and devices are applications of natural law but they incorporate a mechanism that seems to elude them. Still more sophisticated technology transforms this division into a real barrier that not only takes us farer from the nature and also from the human nature but it distorts it. Meanwhile, the abyss between the growing specialism of the science and the technology and level of the scientific knowledge of the common people (as for example new foundings of biology or quantum physics). Autonomy of the individual in the sphere of technology condition by potential economic interests is still more problematic.

3. We are invaded by the ideology of the power of the science, by its unlimited ability to solve every problem (in the same way as we were invaded by the ideology of market auto regulation!). Now, as never before, it is necessary to analyse the limits of the science or at least the limits of its uncontrollable development. This does not play down the science, on the contrary, the value of any means consists in discovering until where it is valid and can be used without doubts.

The methodology of the science, to be rigid and efficient, has to select or circumscribe specific phenomenon or environments present in the variety of the nature. The undisguised power of this approach makes also clear the limits and partiality, because it necessarily omits many other aspects. The problem emerges (and can become very serious) when relation between these two environments are ignored or excluded. For example, what are the “side effects” of remedies (which are also funny aspects of “aimed” military actions)? Why these effects were not studied before? The examples are endless: the Thalidomide case; the abuse of antibiotics which creates resistant strain; the discovery that 97% of DNA does not codify in case of proteins (it has been even called junk), but it has the key role as for the gene regulation etc.

In the information society, we are invaded by mass of information, which we are not able to control. The science and technology used to promise to save us, by the development, from the necessities, work, world hunger, but instead these problems are becoming more serious! The big promises of the technological scientific development are often contradictory to the reality.

4. The modern science, the quantitative one and the mathematics is a historic product of the western society in the era of capitalism development and of the industrial revolution. Some other societies were rivals of the West as for the scientific and technological contributes (China, Arab countries) but they did not need to develop quantitative science.

On the basis of this origin, the science has incorporated the proper logic of capitalism in its methodology, e.g. exploitation of the nature and human work. According to the dominant ideology, the science researches nature to discover it but it claims to discover it to transform it according to practical scopes (the most of them economic scopes) and to exploit it. Care for the harmony of the nature, its rhythms, which are so different from those frenetic and greedy rhythms of our society, becomes secondary. This attitude is very much different from other societies, for which maintaining harmony and balance of the nature, including the man, has been always essential.

Today, we are rediscovering, although it is still the minority, the necessity of holistic statement instead of that reductionist.

5. The logics of the nature exploitation, ignoring (or denying the limits of the science) has lead to a growing contradiction with the nature, to a real war with the nature: the science seems to have become a means of the new “superman” that gained unlimited power over the nature! Scientists feel too often, charged by its means (or powerful interests); they can modify the nature ad *libitum* denying limits of their knowledge. But the nature presents

different levels of organisation that respects law or different levels being mutually dependent: modification of elements on one level has often unpredictable effects on other levels. The nature reacts with its own mechanism, which can be never dominated completely by the science. In the complex, nonlinear systems, a small modification can have unpredictable effect on the entire system (the metaphor “butterfly’s effect”): there are thresholds, behind which trigger irreversible divergence.

Like this, we will “scientifically modify” genetic code, we will introduce substances and technologies, whose long-term synergic effects we ignore, do not mentioning atomic armaments with which we are preparing our own holocaust!

I am getting convinced - as the contents of the science itself are not neutral, as for their possible positive or negative use – the same superior intelligence of homo sapiens lead him to oppose nature, to violate its rhythm and mechanism, to crush the journey of biologic evolution. Was it evitable to pass from the straw hut to the city of cement? But the city opposes natural mechanisms.

6. This science, beside introjecting the logic of nature exploiting, has often served to economic interests that accentuate damage to humanity and to nature. There are evident examples (as remedies) but the attention has to be paid to sectors in which these interests are less evident. The mechanism of profit becomes irritated trying to exploit anything beginning with elementary social services, vital base of existence (water), ending with natural elements as the genetic equipment or antique popular knowledge (Vandana Shiva’s analysis on effects of “green revolution”).
7. The most evident case is the relationship between the science and the war. You can hear speak about “freedom” of the scientific research but it is hidden that thousands of scientists work in laboratories dedicated only to military research and means of killing! There are also scientists working for the army in the university research institutes. Certainly, the financial resources directed (direct and secret) to this sector are richer than in the case of basic and civil research. The situation is getting worse after the end of the Cold War, in an “economy of war” that supports economies in crisis: the balance between the two blocks (though full of terror) used to auto-limit development of the very new weapons, while in the unipolar world the development of means of destruction does not find limits any more and makes investments in scientific and applicative sectors.
8. Thus, the “freedom” of the science and of the research is a myth, an ideology, often an excuse to do what they want without any control. But available resources (financial, material, human) are limited and therefore selection of sectors, fields and projects are necessary and are still made. The problem is who and how chooses. The logics and way how selections are carried on seems to be the worst for the humanity. I am convicted time to ask about the control over the science and scientific and technological research has come.

I understand well the dangerous aspects of the control over the science, reminding totalitarian systems. It can be observed that the defence of “freedom” of the science comes most of all from the university scientists and scientists of the research centres, e.g. a partial, although fundamental sector (dominated by the way by hierarchic power). I am speaking about a totally different control: I mean social control, from the base, control of scientific decisions, technological realisation and their use. This can be based only on social awareness. A scientific mass culture through open and critic means of education with a wide discussion including organised civic society. The scientists have to go down to the level of the common people and discuss with them their work with accessible words instead of very formal mathematic worlds and pompous words. They have to accept to go to the very

substance to get them into discussion, to give up the concept of the knowledge as a form of power. This all is a big challenge but I do not believe there are any alternatives or shortcuts, it is about human destiny.