The Old Ethical Problems in the New Information Society in Russia

Vitaly Gorokhov

1. Free access to information as a precondition for development of democracy and social market economy

In the second half of the 20th century it became particularly obvious that possession of information gives people great strength. In the totalitarian societies it also gives them power or a justification of power. If an individual comes out with criticism of the system, he can always be silenced on the grounds that he does not possess complete information. The strength of bureaucrat lies in the fact that the higher he is on the bureaucratic ladder, the more information he has at his disposal. In a totalitarian society, instead of free circulation and dissemination of dates, information moves through "closed channels". It was false information that moves through "open" cannels. At first, false information from the top echelons is intended for the peoples of other countries and for their own citizens, but later on this phenomenon penetrates all levels of the bureaucratic ladder, the top ones in particular. In such a situation, were crucial correct information is lacking, it becomes impossible influence and control the society, with or without of computers. This was vividly demonstrated by a campaign for the automation of management of industries and individual enterprises, which used to be particularly vigorous in our country in the 70s – 80s years. All enterprises, institutes and ministries sought to by computers, but then did not know what to do with them. What is needed here is not just the design of separate hardware components and their adaptation for the convenience of handling, but planning (or rather reorganization) the human activity with integration of machine components into it. Only by the transition to the era of glasnost did the free movement of information in society create the necessary social prerequisites for the development in Russia of new information technologies and for passing on to a so-called new information society. These, however, were only *pre*requisites.

Attainment of this goal under conditions of total "information" devastation, long lasting disruption of normal communications and a lack of realistic (not false) statistics requires great material expenditures, as these disadvantages must be overcome. Our history shows that the priority of ideology over economy, and often over mere common sense as well, is extremely costly. In the information sphere, this resulted in the lack of normal communication with the West. It also affected information exchange within the country.

Free access to information, including environmental one, – is a necessary condition for development of democracy and social market economy. To take part in the process of making environmental decisions, the general public should have access to information. The old technocratic wave in post-Soviet society has choked itself under the conditions of emerging market economy and the reign of democracy. Russian citizens who had been silent till then began to voice violent protests against, for instance, the turning-over of the Siberian rivers, contamination of water reservoirs, illegal and insecure disposal of health-hazardous industrial waste.

Free information access and public discussion of controversial technological decisions put an end to hegemony of technocracy and expertocracy which had been fully backed by totalitarian society and, in their turn, had given a scientific substantiation of the communist leaders' plans and deeds. We leave in a new situation in this time. The rates of scientific and technological progress are so accelerated that environment fails to cushion man's impact on itself and «digest» man's industrial and domestic waste without the help form outside. The

understanding of environment as a receptacle given by God at the Man's disposal transforms gradually into people's awareness of their oneness with Nature, impossibility for them to exist without environment, of its vulnerability and limitedness, dependence of its (as well as the people's) survival on the people's cautious attitude to environment. As we can see, the main contradiction of modern technological civilisation, noticed by cultural criticism of technology, is that modern technology, on the one hand, opens some unprecedented opportunities for the humanity to satisfy and even make up their own requirements, and, on the other hand, makes it possible to destruct the very basis of human existence that has seemed until recently a dreadful nightmare of sci-fi authors. The problems of humanisation of technology touch directly the very popular in the West philosophy of technology and ethical problems that are not enough being discussed in the Russian society. Therefore is there the possibility of the reappearance of technocratic thinking in Russia also in the new situation, which creates us information society.

At the moment Russia witnesses the revival of technocratic thinking in a new situation. The market economy, if not controlled by society and the government, is known to lead to a more harmful effect on environment and more impoverishment of the biggest part of the population. Under such economic conditions democracy inevitably transforms into arbitrary rule and anarchy. This is followed by natural resources robbery, if there are natural resources, and methodical destruction of environmental conditions of society. Ecological and environmental protection organisations stand in the way of profitable economic and technological projects, while the exhausted and many times robbed people are eager to raise the level of their own well-being up to at least bearable standard and are anxious about the fact that they are not allowed to the public revenues distribution rather than about environmental protection. Such conditions fertilise the technocratic tendencies to revive in society, especially if these technocratic illusions promise prompt enrichment to society and are backed by the technocratic lobby's propaganda. Today we can hear some notes of nostalgia of the time when one could practically without control and care for environmental effects utilise great resources to develop this or that strategic or politically important from the leaders' point of view directions of technology, the point of view that was reinforced, substantiated and often imposed by lobby-groups of experts. This is the domination of expertocracy or «system technocracy» [Lenk 1994].

Under conditions of the dominating totalitarian regime and commanding-administrative economic system of that time, the very idea of any legal or moral responsibility could never arise. Any information of pollution, not-sanctioned discharge and even local catastrophes that were inevitably connected with that kind of new machinery development without taking care of effects on health of the people on the planet and the biosphere of the Earth, was considered secret and never leaked to mass media. In all the countries over the world the information on nuclear power system has been kept in completely intransparent technocratic structures. If such information became available for journalists, it was removed by strict censorship before it was published. Today is it possible to publish this information, but the technocratic lobby's propaganda receives many new informational possibilities in the information society to declare through the mass media this information as scientific or political irrelevant. It is very difficult for citizens to understand some scientific and technological details and to differentiate of the partially false and right information about for example the utilization of the radioactive waste from the nuclear power stations. The information society create not only a new possibilities for a free access and distribution of the important information but also to fabricate false or particularly misspelled date.

German philosopher of technology Hans Lenk said: "Although the human being is not the creator of nature but the latter's creature (s)he seems to be able to imitate and continue processes of creating: In a sense, humans create new materials, even new elements, artificial environments and imposing and very potent technical appliances, procedures and operations

as well as systems. Is man nevertheless "the dominator and processor of nature" as the mathematician and philosopher Descartes had noted at the beginning of the era of enlightenment? On the other hand, man being a very tiny grain of dust in the cosmos extending billions of light years cannot really feel elated as "the crown of creation" any longer: He had to experience in the history of Western science "several sorts of basic weaknesses and traumata" restricting the position of centrality and the respective conviction and complacency: loss of the astronomical centrality within the world (whether in our own planet system or galaxy or the cosmos at large), loss of the property of being "the objective and aim of creation" and the special position compared to other animals. Even the traditional opinion that he would be the being exclusively determined by reason had to be given up in the last century. Nevertheless, the human being enjoys even today still a special position in the order of nature – in so predictions and powerful explanations by using its theories, by manipulating according to their knowledge great parts and objects of nature and materials rather successfully. Humans would use all this for the aims to "exploit" nature for reaching man-made goals etc. This "power" – which might lastly even figure as a negative destructive technological encroachment on parts of natural systems – would be an expression of her or his special position. *Power and knowledge engender responsibility* – a special responsibility of the knowing and powerful being. This responsibility of the human being does not only pertain to human fellows as well as to the future but also to whole life-worlds including natural systems (ecosystems) of the so-called "spaceship earth". This will also show up in the newly discovered and developed capability of being able to systematically and genetically change hereditary dispositions, or genetically to engender new biological kinds or even, e.g. so called chimaeras, mixtures out of different biological kinds. The biotechnical engendering of clones is nowadays already possible, however not yet without mistakes and risks. Will humans now indeed become the technical "masters and dominators" over life and kinds amounting to being a sort of dominator of living nature? Will they play up as some sort of almighty beings in small proportions including potential fantasies of almightiness towards greater scales? Are humans allowed to change their hereditary stock or even "clone" human beings? Technical and gentechnological successes should not induce a new complacency or self-overestimation, a new technological hubris in a world and period evidencing evermore delimitations, side effects and impairments of natural systems connections, in particular those ones induced by human encroachments on nature. Without doubt the far as only humans can theoretically know and explain "nature", develop successful sentence of the bible "Subdue earth!" was essentially involved, did lead to switch some directions. It is true that there was also the biblical imperative to cultivate, heed and preserve the Garden of Eden; yet the idea and imperative of *dominium terrae* is still very powerful, even practically almost dominating our relationship with nature. Instead of stewardship for nature we have domination and manipulation as a strategy. Did we take too literally this imperative of domination over the earth, did we exaggerate it until the limits of the possible or even bearable or even go beyond these limits? In fact it is true, even today humans are subdued by natural laws, they remain – in spite of all their technological power – a tiny part or a powerless particle within the cosmos at large. … Elated and especially required is this being at most by its knowledge and indeed also in the moral sense: regarding its responsibility for the future of humankind and lately even of the biosphere and the ecosystems of the planet. Relative power – and indeed destructive power in the first place – would engender a special responsibility for those beings and systems which are dependent on the technological encroachments, or notably on non-interfering. Nature itself will thus become an objective of human responsibility. … Edward Teller, the so-called father of the hydrogen bomb, stated in an interview that "the scientist or technologist ought to apply everything he has understood and should not put limits on that: whatever you understand, you should also apply. Whether or not man is allowed to, or ought to make, apply, produce, initiate, carry though everything he has able to make, or he can make

and do certainly comprises a specific and precarious ethical problem, indeed" " [Lenk 2003, 26-28].

This is also acceptable for nanoethics and nanotechnology. Scientists believe that if nanotechnology makes it possible to model some process, the technologist ought to apply "everything he has understood", ought to implement this process in reality. Our civilization would be inconceivable without the many things brought about by engineering. Engineers and designers have brought to life what once seemed incredible and fantastic (manned space flight, television, and so on), but they have also developed sophisticated means of mass destruction. Although technology is *per se* ethically neutral, the engineer cannot be indifferent regarding its application. However, a humanistic or anti-humanistic orientation of an engineer does not only find expression under extreme circumstances, it also has its implications in the engineer's attitude towards the users of the products or with respect to the environment. The primary aim of technology and technical activity is to be useful to man, and this principle must be followed both in general and in detail. You can hardly consider it good if an engineer has not done his best to ensure ease of use, safety, absence of noise and pollution, and other requirements placed on the installation, building, or machine that he had designed. Even if those have been engineered through the effort of a large team of professionals, the moral responsibility of each member of the team for the product as a whole should not be diluted. There is another important facet of the problem. Many current manufacturing processes in the mass production of food, drugs, agricultural products and the like are known to be harmful to man and to nature. Today, the social responsibility of engineers and designers to society as a whole and to their clients is particularly topical. While philosophers and scientists argue about the best way to transform the world, engineers and designers are actually transforming it, not always to the best advantage, and often to the detriment, of people, society, and even mankind as a whole. That is why the problems of scientific, technological and business ethics, social responsibility scientists and engineers play a more and more important role in modern technocience and society [Mitcham, and Duval 2000].

This is first of all the existence of the developed scientific and engineering community and then the development of the self-consciousness of scientists and engineers through scientific and engineering education systems. It is also important to have in society the social structures and social institutions that support of the relevant and moral orientation of scientists and engineers. But these conditions do not else exist for the time being in nanoscience and nanotechnology. There is as yet no sustainable scientific and engineering are no special nanoethics courses in the system of nanoeducation and there is a lack of the necessary institutional support in the Russia. In Germany different aspects of scientific and engineering ethics are discussed and investigated already many years ago [Schwanke 1994].

See for that is why nano-scale implantants are already implemented in the human organism and even in the human brain without satisfactory scientific explanation and technological manufacture and sale different nanoproducts [Müller 2006, Baumgertner 2006]. „Currently, special attention in the public risk debate is being paid to synthetic nanoparticles. A vast potential market for nano-based products is seen in this field. New products, based on new properties of nano-materials can be brought about in admixtures or specific applications of nanoparticles, for instance, e.g. in surface treatment, in cosmetics, or in sunscreens" [Grunwald 2008]. "The Food and Drug Administration (FDA) says the rising number of cosmetics, drugs and other products made using nanotechnology do not require special regulations or labelling. In the US, at least 300 consumer products, including sunscreen, toothpaste and shampoo are now made using nanotechnology, according to a Woodrow Wilson International Center for Scholars report. The FDA treats products made with nanotechnology in the same way as other products – requiring companies to prove their safety and efficacy before allowing them to come to market. However, some product categories, including cosmetics, foods and dietary supplements are not subject to FDA oversight before

they are sold, which already worries some advocates. Producing them with nanotechnology adds another layer of concern. … The group cites studies showing that certain nanoscale particles can cause inflammatory and immune system responses in animals" [NewScientistTech 2007] (see also [Nanotechnologie erobert Märkte 2004, Scientific Committee 2007]).

In the 17th-19th centuries human society outlined the understanding of scientific and technological progress as continuous improvement of society and nature on the basis of the growing capacity of scientific knowledge of the world. Up to the middle of the 20th century this illusion and relating to it cosmic, natural scientific and technological Utopias led to blurring up limits of human cognition and technological activity, to development of scientific and technological optimism concerning the chance to make human society happy with the help of more and more advanced achievements of science and technology. This belief in continuous scientific and technological progress, absolutisation of a value-free scientific research, illusion of actual «creatability» of the world on the basis of the obtained knowledge resulted in the emergence of a scientific religion, based mostly on the belief in the power of scientific knowledge and the progressive character of technological activity, grounded on this knowledge. There appeared an illusion that if technology has made the Man of an animal, then, combined with science, it could make a God out of Man, the Creator of not only artefacts but of matter, nature and life as well. Scientific and technological progress is subconsciously taken as a way beyond the limits of the possible. Such notions come back to philosophy of science and philosophy of technology of the late 19th – early 20th centuries, but it was Francis Bacon who had already first mentioned this in his works in the 17th century.

Since that time science was regarded as a means to multiply human knowledge aimed at creating man-made conditions and equipment to facilitate human life. Bacon's confidence in the fact that scientific and technological progress is a humanistic or humanitarian one was also supported by the idea of cultivating ethically neutral knowledge and moral responsibility for its application that could possibly harm people. The task of Bacon's programme of scientific development was to convince the great men of the world that financial and organisational support of science was necessary and useful for society and the state. This programme aimed at «arranging science as an intensive enterprise and institutionalising it socially so that its inventions could serve the man's well-being» [Böhme 1992]. This is the very main goal of *New Organon* and social Utopia *New Atlantis* by Francis Bacon. Multiplication of the man's power, establishment of the man's domination over nature, all useful kinds of art, manufacture, mechanisms and machines with the help of experiments, paying no attention to theology, ethics, politics, metaphysics, grammar, rhetoric and logic – that was the motto of the London Royal Society. This separation of natural science research from all ethical and religious matters that had a progressive character at that time is coming now to antagonism with modern social development because it blurs the limits of the possible for an individual and humanity in general, placing the former alongside of God the Creator as he produces Heaven on the Earth with the help of industry, technology and science. In 1812 Sergey Bulgakov in *Philosophy of Economy* exclaimed with bitterness and suspense: Our generation seized up with this passion to a greater extend is loosing its loosing all limits to define the possible. «The world is plastic», it can be reconstructed and even reconstructed in various ways. We live under the impression of the more and more increasing might of our economy that opens boundless vistas for «cultural creativity» [Bulgakov 1990].

It is only through the connection between science, technology and economy that the slogan *Knowledge is Power* can be realised. This connection, on the one hand, leads to an instrumentalisation of knowledge, and on the other hand, to a growing dependence of even «pure» science on technology and economy. Man is placed in the centre of the world, his economic activity being interpreted as «a new force of nature, a new world-transforming factor that fundamentally differs from the other forces of Nature». Technology, according to

Bulgakov, is «a combination of possible methods of man's impact on Nature for definite purposes set in advance». The very possibility of technology comes from the actual accessibility of nature for man's impact. Nature is treated as a passive source while man is an active, conscious source and in this sense he becomes the centre of the Universe, subordinating the rest of Nature to himself. «His potential world domain gets partly and gradually realised through the economic process». But the Man does not equal God, he «does not have omnipotence, ability to create everything he wants out of nothing». Man can act freely and originally only when he deals with the methods to use his own nature, his own nature as well as environment being given to him [Bulgakov 1990, 46-47, 62].

If ancient society set science a task to cognise that man can cognise, then Bacon sets a task to achieve man's domination over nature. This domination means that humanity with the help of exact knowledge of natural causes can use nature for some personal ends. By doing this, humanity would like to enjoy the rights to utilise nature, which was given by God. Man's domination over the material world is based, as Bacon sees it, totally on science and art. The danger may arise, however, of scientific and artistic results being placed at the service of vice and luxury or something of the kind, but it does not seem to Bacon too perilous because it cannot inspire anyone. Moreover, he believes that unlike political activity that aims at improving the state of affairs practically through the use of force and injustice, inventive activity can bring happiness and wealth without doing anybody harm.

Distinguishing three types of ambition that science could serve: (1) to multiply personal power in your native country, (2) to multiply the might of your native country and to make it dominate over other peoples and (3) to broaden the domination of human society over nature as a whole; Frances Bacon stresses that the latter is undoubtedly the healthiest and the noblest. Trusting professional ethics is not enough from the present-day point of view. However, he does not discuss the effects of such applications of scientific and technological achievements for personal and political ends that do people harm. In his social Utopia *New Atlantis*, he speaks on the contrary, about the necessity of keeping these achievements as national secrets. The strict antagonism between man and nature, rare before Bacon but well established after him, is also problematic.

Science is to investigate the forces hidden in nature and enlarge as much as possible man's power over nature that is interpreted as a giant workshop for human activity. *New Organon* subserves this task as it deals with the logic of invention, the methodology of inventive activity that fundamentally transforms the world, for example, the invention of gun-powder or the compass. The application of a single invention inspires many people to consider the inventor a superman. But Bacon believes the discovery of a method that could facilitate further inventions deserves even greater respect. This method should throw light on things as they are, without superstition and deception, errors and confusion, which is worth more than the fruits of inventive activity altogether. Thus, Bacon changes the very system of human knowledge that is no longer treated as a closed system, a canon, but as a constantly renewable open system, a result of collective cognition. Science should in the future become a science of activity while its methodology should be based on a combination of empirical and rational abilities of the spirit. The methodology of research is here not a means of knowledge organisation but the transference of collective experience into underdiscovered fields of science. From here comes Bacon's concept of *scientific and technological process as a scientific experience passed over from generation to generation* and obtained at every moment of time as a result of co-operation of separated labour of researchers.

For the first time Bacon considers science to be scientific research, organised into research laboratories according to application spheres, meeting some social needs, i.e. serving these social needs directly. However, these are the needs, above all, of the national state, including scientific and technological development in the military sphere. As we can see, Francis Bacon's programme articulates and develops an aggressive approach towards the utilisation of

natural resources for the ends of human society. The programme elaborated, being undoubtedly progressive at that time and having some underwater stones, was successfully implemented in the 19th – 20th centuries, but at the end of the 20th century we have come to the conclusion that this programme has exhausted itself completely [Böhme 1992].

Such super optimism concerning science and technology was given its final shape in the 19th century. Even *Renan,* a deeply religious Christian scientist for example, says in one of his earliest books, *The Future of Science* (written in 1848–1849 under the impression of the French Revolution but not published until 1890), that scientific belief is a supreme derivation from Christian thinking and tradition [Wagner 1970]. From his point of view, science has the powers of both revelation and creation. Since its task is to organise people and God Himself, it needs full autonomy and boundless freedom. In this case the researcher becomes an authority for himself, free from any control. Thanks to science man, who is also the embodiment of the Spirit, achieves domination over matter. Such domination, as Renan expects, can be achieved as a result of scientific research, possibly, in a million years when human society perceives the laws of life and the atom and, by transforming elements and altering species, gains boundless power and control over the Universe. Scientific knowledge will become a real basis of 'intellectual elite' power that with the help of 'preventive terror' will save everything on the Earth from destruction and let the elite approach God, as they become super human. If the secrets of life can be discovered only at the sacrifice of humanity itself to build up a new world, it will mean that the predestination of human existence has already been achieved, i.e. (that is) man, grown up in the process of evolution from the animal kingdom, has mutated into the divine matter. Two decades later under the influence of the results of scientific and technological development, which can serve vice as well as virtue and whose consequences cannot be foreseen in the predictable future, Renan realised that by doing this man can break all possible limits. In the preface to his book Renan admitted that the expectations of boundless happiness which human society might achieve with the help of scientific and technological progress was purely an illusion.

In the same way P.K. Engelmeier, a Russian engineer and philosopher of technology, begins his booklet 'Technological Results of the 19th Century' with the words full of optimism: 'Our 19th, technological, century is coming to an end, the century of steam and electricity, the century of unprecedented conquest of forces of nature'. Then, describing the achievements of technological progress, he writes: 'Technology has conquered for us space and time, matter and power, being the power itself that irrepressibly turns the wheel of progress' [Engelmeier 1898, p. 6]. Giving a rather optimistic assessment of the achievements, Engelmeier believes that the technological outlook was dominating in the 19th century not because of wide development of manufacture, railways, steamers, telegraph and other formal signs of the technological century, but also because of an inward tendency of Western European culture to overcome actual obstacles with actual power. Summing up the results of technological progress, Engelmeier mentions that for many thousands of years technology has been acting as an unconscious power unconsciously coming into a single combat with the elemental forces of nature. In the 18th century technology was recognised, called by its name and placed alongside other noble and free professions [Engelmeier 1898]. *The main scientific feature of technology in the 19th century was to conquer the power of nature.* The function of science is to predict facts while the function of technology is to influence nature, evoking by artificial methods the desirable facts and to retard the undesirable ones. The technological outlook regards the world as a game of the forces accessible for our understanding and our impact on them, in other words, it plaits the will of man into other natural forces that govern the order of phenomena. To put it in a short phrase, the technological outlook is the 'Man is the architect of his own fortune' formula [Engelmeier 1900]. Man has learned to guide life according to his own desires. Engelmeier calls this skill technology. The genius of humanity over the past two centuries has surrounded us with the man-made microcosm within the natural one, because

man should have done something to have his requirements satisfied, this something being expedient reforms of his living conditions. Which is why Engelmeier grants the leading part in society to *engineers* who *should become the technological elite of society*, on whose purpose the system of engineers' training should be improved. The emergence of technocracy in the 20th century showed how 'efficient' this management of society can be. It was rather difficult for Engelmeier as well as for Renan to foresee to what uncontrolled consequences this boundless scientific and technological progress might lead, especially in the military sphere.

In the USA, we already find as an objective in the foreground a task in «bionanotechnology» to make an ideal soldier ("Soldier Nanotechnologies") with extension of human sensory abilities and expanding brain functions through technical aids [The National Nanotechnology Initiative Initiative Strategic Plan 2007]. "Nanotechnology, in combination with biotechnology and medicine, opens perspectives for fundamentally altering and rebuilding the human body. At present, research is being done on tissue and organ substitution, which could be realized with the help of the nano- and stem cell technologies. Nanoimplants would be able to restore human sensory functions or to complement them, but they would also be able to influence the central nervous system. While the examples of medical applications of nanotechnology cited remain within a certain traditional framework – because the purpose consists of "healing" and "repairing" deviations from an ideal condition of health, which is a classical medical goal –, chances (or risks) of a remodelling and "improvement" of the human body are opened up. This could mean extending human physical capabilities, e.g., to new sensory functions (for example, broadening the electromagnetic spectrum the eye is able to perceive). It could, however, also – by means of the direct connection of mechanical systems with the human brain – give rise to completely new interfaces between man and machine, with completely unforeseeable consequences. Even completely technical organs and parts of the body (or even entire bodies) are being discussed, which, in comparison with biological organisms, are supposed to have advantages such as – perhaps – increased stability against external influences" [Grunwald 2005].

We mentioned ethical problems which originate today even more in connection with the extended power of humans to encroach in non-human environments, on "nature". This would be valid especially as regards the possibility of new manipulations and encroachments on the genetic basis of life, the hereditary structures figuring in the genes. There is also a problem of the neurosensory men-machine interface that is a question of the compatibility of the damaged bio(natural) system and introduced implant (artificial system). A problem of sensoric-neuroelectronic interfaces would occur, if implants are inserted in an injured or partially damaged biological system. An injury within the central nervous system may hardly be healed or regenerate in a natural way. On the contrary, generally additional parts of the injured biological system will also degenerate or deteriorate. Nevertheless, due to the extreme manipulative capabilities of human encroachments there develops a rather or even totally a new ethical situation of the orientation towards humanitarianism. This requires new behaviour rules and possibly even a new ethics in a stricter sense. The future of "nature" and of human life seems to be in danger or at risk.

Trying to channel this rather "wild" expansion and growth of the rampant *technoscience super-structure* and its technological development and *systems technocracies* would indeed require a sort of revival or resuscitation of apparently old-fashioned virtues of *reason* in such domains as philosophy, humanitarianism, social responsibility and technology assessment. To note, the instigating effect of military developments and research for and in technology and the applied sciences is still going strong: R & D lead the way – mostly, indeed, in the form of military research and development, even frequently in so-called "pure basic research". The problem of the technology assessment in the nanotechnology become complicated because there is no developed scientific community and therefore are no any experts in nanoscience

and technology. « … we need to distinguish the loose everyday sense of 'an expert' — which can mean no more than an individual who knows a lot about a topic — from a more specific sense of the term, which is used when we are discussing the social role that experts should play. There are four features of expertise important to this social role that should be made explicit: 1) The expert has specialized training and knowledge not easily available to a layperson; 2) this knowledge is usually technical (this means at least the knowledge which is of specific methods for knowing or doing things); 3) the expert is recognized as such by his/her own professional community; 4) the professional community is recognized as legitimate within the larger society. While the first and second feature apply unproblematically to nanoscitech, the third and fourth are more complicated» [Sanchez 2005]. In this case one of the key role in nanotechnoscience play the philosophical reflexions from the interdisciplinary and transdisciplinary point of view. We have to *reinstall philosophy*, in a rather modern and *up-to-date*, primarily future-bound form and fashion and *cross-disciplinary* combination. We have to develop, if not reinvent, a *practice-oriented* philosophy of technology, planning, risk assessments, responsible decision making, globalisation, etc. combined with notable perspectives for a human and humane future orientation, the creative designing of new ways and strategies to confront the mentioned overriding problems of social over-flooding and to develop a kind of rather optimistic activism, achievement-orientation and socially responsible normative stance in all our institutions of education and, beyond that, in our social and political as well as all-too-human lives.

Bulgakov emphasises that the theory of technological progress was transformed in the 20th century into a kind of progress theology that foretold the achievable with the help of modern technology future of the happy, proud and free man. To bring happiness to as many people as possible was put forward as a goal of that super modern religion where human society equipped with technological knowledge played the role of God [Bulgakov 1990]. That interpretation of progress comes close to philosophy of technology by Fred Bon, according to which the question 'What should I do to be happy?' is the most important question of technology [Bon 1898]. The first Russian philosopher of technology, P.K. Engelmeyer, who also came from the initial premise of Bon, deemed the significance of technology in modern culture to have an eudemonical approach: "Man is a hammer-man of his happiness". These words express so called technological optimism of the first philosophers of technology. "Technological optimism is more evident in the statements that treated technological process as the cause of cultural progress in general or just identified with the progress itself… The extreme form of technological optimism was characterised by specific euphoric expectations of the future» when Humanity will be able to reach material but not cultural Heaven on the Earth and even obtain cosmic power" [Van de Pot 1995]. However, Fred Bon as well as Engelmeyer consider this goal of achieving Happiness to be subordinated under a higher idea of achieving Virtue. "Technology is an application of our life knowledge to life itself, i.e. on the one hand, to maintaining of life (protection), on the other hand – to expanding of life (aggression). All that hinders life is vice and harm, all that promotes life is virtue and use. Technology is a means to fight against Harm and its conversion into Use". Ethics deals with the matter of Virtue whereas technology deals with the matter of Use. "As the goals of Virtue and Use interrelate, or as they sometimes differ, ethics and technology may interrelate or differ", respectively [Bon 1898]. Speaking about the eudemonical ideal S. Bulgakov mentions that this ideal, if taken as a scale for the assessment of historical development, inevitably leads to immoral consequences. Technology begins to dominate over Man, not to serve him, and makes him not happy (as, for example, Engelmeyer thought) but miserable.

According to Bulgakov, first, the eudemonical ideal leads to an idealisation of human requirements, second, this idea treats the sufferings of one generation of people as a bridge to the happiness of the next generations. It makes no difference among to the concept if these are of the sufferings of the present generation to achieve happiness of their children and

grandchildren (according to Dostoyevsky, to manure future harmony by personal sufferings), as the communist ideas promised, or, on the contrary, happiness of the present generation is achieved at the expense of the destroyed life space for all generations to come, if we speak about squandering of natural resources and contamination of environment. It is well-timed to remember Dostoyevsky saying that to build your own happiness upon unhappiness of the others is an immoral thing. „The first and the main task that theory of progress sets itself is to show that History has sense and the historical process is not only evolution but progress as well. This task is too heavy for empirical science as it has a metaphysical character. The absolute law of Virtue that should become the law of our life „when applied to historical development tells us to mean well in history and do our best to promote the realisation of Virtue, tells us, in other words, to mean progress. Progress is, from this point of view, a moral task, not existence, but the absolute imperative." [Bulgakov 1990]. The energy transmitted by huge machines rendering amounts of energy not available before and multiplied by the technological power of man regarding interference and change executed by humans over nonhuman environment, over nature and especially the availability of interventions and even nanomachines will lead to extraordinary challenges for the mentioned "future ethics". From the immensely grown capabilities of technological impacts totally new situations for ethical orientation will occur not only regarding behaviour rules but also pertaining to responsibility and provision as well as providence and caring for the future. This would require new norms, in part changed values and frames of reference: this is beyond any doubt a totally new situation in the history of humankind: humans had never before had such power to destroy or decisively harm all or some life in a specific ecological system or even on a global scale by using their technological interventions and interferences as well as encroachments on these natural entities. Ethics would gain a new humanistic relevance not only ecologically speaking but also as a new future-oriented ethics of responsibility.

As we can see, the situation in the 20th century has changed. "We cannot hope for omnipotence of Nature any longer. The natural mechanisms are not sufficient at present to preserve the biosphere. New methods for regulations, based on the understanding of natural processes and to some degree of the managing such processes, are required. The anthropogenic regulation is the forecast of natural cataclysms and punctual decrease in speed of the process. It is the choice between the immediate profit and long-term revenues in the usage of natural resources" [Marfenin 2000] and mankind.

Making reference to Renan, Berdiayev warns that technology can provide man, even a small group of people with a great destructive power. "*Soon peaceful scientists will be able to produce upheavals of historic and cosmic character*". This leads to the concentration of power in the hands of those who possess technological secrets. The future of all humanity depends on this. In Berdiayev's opinion, «the technological epoch», the epoch when technology dominates over the human soul, will inevitably end in victory of the human spirit, not in negation of technology, but in its subordination to the human spirit and spiritual values of life. Technological civilisation, society of technology and machines want man to be their part, deprived of personality. „Technology would perpetrate a deadly punch to the humanistic ideal of Man and culture. The machine is essentially anti-humanistic." Technology is always merciless to the living stock, but it is mercy to all the living and existing stock that should restrict the power of technology in our life [Berdjajew 1949]. „Mighty strides in physics have been characteristic of our era. Within physics there is occurring a genuine revolution. But the discoveries, which the physics of our era is uncovering, are characteristic of the decline of a culture. Entropy, connected with the Second Law of Thermodynamics, radioactivity and *the decaying apart of atoms of matter*, the Law of Relativity – all this tends to shake the solidity and stability of the physico-mathematical world-perception, and it undermines faith in the lasting existence of our world. I might say, that all this – represents a *physical apocalypsis*, a teaching about the inevitability of the physical end of the world, the death of the world"

[Berdyaev 1992]. In the relation to nanotechnology we may today speak about Nano-Armageddon or apocalyptic(al) nanoethics. „The recent excitement about nanotechnology is only the latest offspring that comes in the bizarre form of apocalyptic ethics, propagated particularly by influential transhumanists“ [Schummer 2006].
Indeed, overriding multi-disciplinary knowledge and information are and have to be used almost everywhere (any large-scale practical problem whatsoever is multidisciplinary!) on the one hand, and we are, on the other, bound to a human, humane, humanitarian, and ecological perspective, i.e. as regards the latter one of sustainability and sustainable development, that have to be taken into account in all essential social and political realms leading beyond the mere addition of information, extension and scope of networks as well as the ever faster breaking waves of innovations in technologies and applied sciences to be implemented for economic, military and industrial practice. Many people even talked about "the military-industrial complex" having undergone a mutation towards an "economic-industrial-technological-scientific complex" of technoscience bearing the characteristics of a real super-structure impregnating all areas and walks of life. That is to say nanoethics has to combined scientific, technological or engineering and economy ethics.
It would distinguish the human being most specifically that it should bear responsibilities and duties not only for his own actions but also for and as regards other living entities of nature and natural systems. As such a distinguished part of the totality of nature, as a specifically powerful agent (s)he has to take over a representative responsibility for "the total" in relationship and proportion of his technological power. This is true also morally speaking. It is indeed specifically human and a characteristic of part of their special position and dignity that humans may and have to attribute to other beings and kinds some "right" of existence and preservation, quasi-rights so to speak. That means that they have to take over duties of protection towards them *without reciprocity*. This applies to the total system as well as the larger systems of nature, since the human being is the knowing being who is able to go beyond its anthropocentric purview lending a (quasi) right of existence to other living beings. This overall ethics of *stewardship* seems to be more dignified and humane than the traditional self-limitation on human interests and comprehensive domination. This should be an insight not only in economical, ecological, informational, technological ethics but also for nanoethics.

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