Elena O. Trufanova

Philosophy of technology in Russia: origins, history, current picture

Dedicated to the memory of Vitaly Gorokhov

Abstract: The paper analyzes the genesis and history of philosophy of technology in Russia: from its birth in the end of the 19th century till present time. The birth of philosophy of technology in Russia is attributed to P. Engelmeyer, who has originated the very term "philosophy of technology" and with his numerous works has laid the foundations for this new discipline. Next stage of the development was the critical approach towards technology expressed by Russian religious philosophers of the beginning of 20th century – N. Berdyaev and S. Bulgakov, who felt that technological development is a threat to essential human qualities. Another Russian religious thinker of the same period P. Florensky has provided his own versions of "organ projection" approach to the technology, following the steps of E. Kapp. In the soviet period the system approach and general systems theory were being developed – from the early works of A. Bogdanov in the 1920-s to V. Sadovsky and E. Yudin in 1960-s. The similar problems were discussed from the point of view of "methodology approach" in the Moscow Methodology Workshop lead by G. Shchedrovitsky. The most prominent era of the philosophy of technology in late Soviet period (from 1970 onwards) is connected with a plethora of philosophers, the most important figure of those being V. Gorkohov. Gorokhov wrote on history, philosophy and sociology of technology, has dealt with problems of techno-science, nanoscience, technology assessment and education of the engineers. Finally, the paper draws the current picture of the philosophy of technology in Russia, pointing to the main researchers and main subjects of research in this field in present Russian academia.

The birth of philosophy of technology in Russia coincides with the birth of philosophy of technology in the world. This statement does not imply that philosophy of technology was originated by Russian thinkers and then spread to other countries, but, as we will show later, the Russian philosophers have made a significant contribution to the development of this relatively new philosophical discipline.

Prominent Russian philosopher and historian of science and technology Vitaly G. Gorokhov insists that both engineering and philosophical reflection on the questions of engineering and technology have developed in Russia in close connection with Germany. German and Russian engineers and thinkers have constantly interacted – German papers and books on technology have been translated into Russian, Russian engineers had their traineeships at the German factories etc.

Thus, the development of philosophy of technology in Germany and in Russia at the turn of XIX-XX centuries went hand in hand (Gorokhov 2001; 2009b).

1. Petr Engelmeyer's "technicism" – the birth of philosophy of technology in Russia

The origins of philosophy of technology in Russia are traditionally attributed to Petr K. Engelmeyer (1855-1942), who has used this very expression *filosofia tekhniki* (philosophy of technology in Russian) to characterize his field of work. His most prominent works *Technical sum of the XIX century* (Engelmeyer 1898b) and 4 issues of *Philosophy of technology* (Englemeyer 1912) have been a big start for the strong tradition of philosophy of technology in Russia. Engelmeyer was a Renaissance man of sorts: philosopher, engineer, entrepreneur, artist, etc. He had personal connections to many prominent thinkers of his time – from the writer Leo Tolstoy (they held a dispute in letters on the questions of ethics) to Austrian philosopher Ernst Mach (Engelmeyer also corresponded with Mach and claimed himself to be Mach's follower). He has also attended many international conferences both on philosophy and on the problems of engineering. Many of Engelmeyer's papers were published in German journals (Engelmeyer 1893; 1894; 1895a; 1896b; 1900b).

Engelmeyer can no doubt be counted among the founders of the discipline of philosophy of technology. At the IV World Philosophy Congress in Bologna in 1911 Engelmeyer gave three talks and the central message of those was that it's about time to establish new branch of philosophy: philosophy of technology. By his own account, this idea was generally supported, by Henri Bergson and Ernst Mach in particular, as well as by the President of the Congress – Italian mathematician and philosopher of mathematics Federigo Enriques (Engelmeyer 1912, Iss. 1, p. 7). Although Engelmeyer did not invent the term "philosophy of technology" itself (he often used the word "technicism" to label his own philosophy of technology), he has widely promoted it.

He described the philosophy of technology that was being born at the moment as "the new science that shall ascertain the role of technology as a factor of culture" (Engelmeyer 1913, p. 113). Philosophy of technology to his mind should analyze the relations between technology and culture on the whole, technology and art, technology and law, technology and economy, and, especially, technology and science. Philosophy of technology should explore the ways that humans use to adjust the nature to human needs. While the goal of science is the prediction of facts, the role of technology is "affecting the nature, to artificially summon the desirable facts and to block the undesirable" (Gorokhov 2009b, p. 22). Overall, philosophy of technology can be widely understood as philosophy of human activity (Engelmeyer 1898, pp. 105-106).

Engelmeyer mentions four different types of worldviews that have been prevalent in European thought – artistic, mystic, scientific-philosophical and technical. To his mind, the technical worldview dominates since 19th century. The main trait of this worldview he describes shortly with a proverb «eve-

ry man is the architect of his own fortune» (in Russian this proverb literally sounds like "every man is a smith of his own happiness"), meaning that technical worldview is characterized by the belief in possibility of overcoming any obstacles with technical means. The 19th century is called by Engelmeyer "the technical century".

He argues that while wild animals passively adapt to the natural environment, the human with the help of technology does not need to adapt his body, because he can adjust the environment to the needs of his organism (Engelmeyer 1911b). Considering many different definitions of technology, he formulates his own: "Technology is an art of systematically and based on the known natural interactions calling into being certain things" (Engelmeyer 1899, p. 97). He insisted on not confusing science and technology with each other, and claimed that while science seeks truth, technology seeks utility.

In his discussions with Leo Tolstoy Engelmeyer criticized the former's "nonviolence" principle. Tolstoy has regarded any resistance or fight against evil as unacceptable, while Engelmeyer insisted that technology is proactive, it is a "mean of fight against harm and turning it into benefit" (Engelmeyer 1898a, p. 45), while "everything that opposes life is evil and harm, and everything that supports it is good and utile" (*Ibid.*). Though relations between ethics and technology are complicated because the goals of good and utility are not always the same, and while ethics concerns itself with good, the technology is dedicated to the questions of utility (*Ibid.*). Their theoretical disagreements did not prevent Tolstoy to write an introduction to Engelmeyer's work *Inventions and privileges: a manual for the inventors* (Engelmeyer 1900a).

Engelmeyer's special philosophical interest was dedicated to the problem of creativity. He concentrated his research on the creative activity of the engineer, of the inventor (*Ibid.*). He sees the process of the invention as a "three-act" (*trekhakt* in Russian) consisting of will, knowledge and skill, that means: 1) setting a goal, 2) knowing how to reach it, and 3) carrying out this plan in practice with material objects. The research of engineering invention for Engelmeyer should have been a basis for the "universal theory of creativity" that he called *eurology* (Engelmeyer 1910; 1911a; 1914). Eurology should have become a special discipline studying the creative processes and invention (Engelmeyer 1925).

Despite the vast input in the philosophy and social research of technology Engelmeyer's works were not popular in Soviet Russia. The main reasons for that should be the change of ideological climate and Engelmeyer's connections with E. Mach. Engelmeyer himself considered his own theory of technology as a development of Mach's ideas. But after Vladimir Lenin's strong criticism of "machism" in his 1909 *Materialism and empiriocriticism* work, when Soviet Regime came to power, "machism" became a swear word in Soviet philosophy and anyone supporting Mach's ideas was considered a renegade. It did not bring any harm to Engelmeyer personally (he was considerably old by that time), but it did not let other scholars continue his line of work, and his ideas have taken their rightful place in Russian philosophy only in the 1980-s, when he was "rediscovered" by Vitaly G. Gorokhov.

2. Russian religious philosophy and philosophy of technology: kulturkritika of technology

Some issues of philosophy of technology were also present a lot in the works of Russian religious philosophers – Pavel A. Florensky, Nikolai A. Berdyaev, Sergei N. Bulgakov, etc. "Russian cosmism" movement of in early 20th century has also heavily relied on technology when it came to solution of the fundamental problems of humanity. The fate of the human they claimed was "cosmic" – the humanity should eventually go into space and spread among the galaxies – and it was engineers who could make this fate finally happen. Pavel A. Florensky (1882-1937), an Orthodox priest and a mathematician by education who after the Russian revolution had to quit his priesthood and start working in the field of dielectrics engineering, have reflected upon Ernst Kapp's concept of "organ projection" – in the paper of the same title *Organ projectio* (1919) (Florensky 2000, pp. 402-422). His philosophical reflections on the anthropological aspects of technology were also represented in his book "*At the watersheds of thought* (Florensky 2000) that consists of his papers on both theological and philosophical subjects written between 1917 and 1926 (including *Organ projection*). To his mind a live human body and its members are the prototypes of technical artifacts. The fall of man (in the religious sense) has brought a divide between human and the world and technology helps to overcome this divide. To his mind every technical device appears from organ projection – an iron comes from human hand, a lens from human eye, electricity – from neural system. Even when we do not see the direct resemblance (for example, what body part does the wheel resemble?), it only means that we do not know our organism's work well enough so that we cannot find the origin of this projection. A house where all the technical tools and artefacts are brought together («the tool of tools» in Florensky's words) has the human body itself as its prototype, while at the same time the human as microcosm resembles the world in general (macrocosm) (Sedykh, Khamenkov 2016).

Nikolai A. Berdyaev (1874-1947), a religious and political philosopher, considered to be a representative of Russian branch of existentialism and personalism, one of the most famous Russian philosophers who left Russia on the so-called "Philosopher's steamboat" in 1922[1], saw development of technology as a threat: the domination of technology that he felt was present at his time was destroying the human souls. In his article *The Human and the Machine* (Berdyaev 1933) he claimed that technologization of culture leads to de-humanization of human. The machine is by its essence anti-human, thus technology strikes against the humanitarian values of culture. Being a religious philosopher, Berdyaev ponders the question of Christians' relations to technol-

1 "Philosopher's steamboat" (*Filosofskij parohod*) is a name for the event that took place in 1922. More than 160 Russian intellectuals whose ideas were opposing the Soviet ideology, were expelled from Soviet Russia and they and their families were transported away from Saint-Petersburg to Szczecin (German port at the time) onboard a steamboat. Among them were prominent Russian thinkers Nikolai Berdyaev, Sergei Bulgakov, Semyon Frank, Nikolai Lossky, *et al*.

ogy. He claims that while most Christians regard technology neutrally, thinking that it is engineers' job to think about it, some of the Christians feel technological progress to be the work of the Antichrist. He thinks however that both these points of view are erroneous. The first view supposes that only engineers, not all people, are responsible for technology, and the second view suggests that no creative intervention in the fate of the world is possible. He considers also the third point of view, expressed by Nikolai F. Fedorov (1829-1903), who belongs to the "Russian cosmism" tradition. Fedorov sees science and technology in context of Christianity as the means to achieve virtual eternal life and even to resurrect the dead. Berdyaev concludes that it is what human spirit does with technology that matters, and that technology can help rule over life itself. Another fear expressed by Berdyaev is that those few who will possess technological secrets, will be able to rule the fates of the world. "Technization" of culture was seen by Berdyaev as a threat to humanity, and humanity should stand against the dominance of technology. He believes though that the human spirit triumphs over technology at the very end, and technology will serve human, not vice versa.

Sergei N. Bulgakov (1871-1944), Orthodox priest and philosopher, also an emigrant from Soviet Russia, in his central work *Philosophy of household* (Bulgakov 1912) also considers technology as danger, he feels that the human relying on technology claims to be omnipotent like a God, while it's just an illusion. The nature takes its revenge on human with natural disasters, global climate change etc. for his arrogance. Bulgakov writes that the progress of technology is seen as a way to happiness for all humanity, but it is not so: the technology instead of bringing happiness to the human is turning human into its slave.

For both Berdyaev and Bulgakov, who had to flee from Soviet Russian, technology was an embodiment of the ultra-rational political machine of totalitarian regimes. They saw technological civilization as opposing everything human. Overall this pessimistic view of technology and the evaluation of technology as a threat to the culture, was called the cultural criticism *(kultrukritika)* of technology.

3. System approach and methodology

Another strong tradition of research in Russia that relates to philosophy of technology is the studies in the field of general systems theory and the system approach. The main figure in this field in the early Soviet time, whose ideas have gained popularity again recently, is Alexander A. Bogdanov. Bogdanov is considered by some authors to be a founder of systems theory, predecessor of L. von Bertalanffy and N. Wiener (Loktionov 2016) (the German edition of the work has appeared in 1928, so both von Bertalanffy and Wiener had a chance to read it (Gorelik 1987). Alexander A. Bogdanov (1873-1928) (the real surname – Malinovsky) was one of the revolutionary leaders and socialist thinkers of the early Soviet time, being at the same time science fiction writer, a medicine practitioner and an encyclopedic scientist. He was also the founder of the blood transfusion practice in Russia (the

first Institute of blood research in the world was founded with his help and he became its first head) and tragically died as a result of a self-conducted experiment in blood transfusion due to rhesus conflict.

He called his philosophical views "empiriomonism" and they were somewhat similar to those of Mach. However, the center of his philosophy was the new science he proposed that he called *tektology* (Bogdanov 1922). Tektology was supposed to be a science comprised of the universal laws of organization, thus anticipating systems theory and cybernetics. Bogdanov wrote that all Universe consists of different organized complexes, from human beings to star systems, each complex should correspond to its environment and adapt to it. A stable and organized complex is greater than the sum of its parts, while disorganized complex will be less than the sum of its parts. He reflects upon the holistic and emergent qualities of the phenomena as well. The main goal of the tektology was to formulate the one universal set of laws of organization of all objects, and Bogdanov have tried thoroughly to do that.

Another take on the similar problems was provided in 1950-1960s by Georgy P. Shchedrovitsky (1929-1994), Vadim N. Sadovsky (1934-2012), Erik G. Yudin (1930-1976). Their work was related to the so-called Moscow Methodology Workshop (MMW) (Rozin 2017) that was founded by Georgy Shchedrovitsky under the influence of the works of A. A. Zinoviev as early as in the late 1950's. The circle evolved into a new methodological tradition and was comprised of Shchedrovitsky's students. A figure of the "methodologist" was seen as someone who does research of the project activity and engineering from the outsider point of view, outside science and technology. Standing outside and applying so-called organisation/activity games as an instrument for the analysis and development of various systems of "mental activity" (programmes, intellectual trends, organisations etc.), methodologist reflects upon the situation in question and can provide the fruitful insight in the matter (Shchedrovitsky 1995; 1996).

Both Vadim Sadovsky and Erik Yudin took active part in the work of the MMW in 1950-1960-s. In 1960 Sadovsky together with the future prominent Russian epistemologist Vladislav A. Lektorsky (Lektorsky, Sadovsky 1960) have published an article *On the principles of system research* where they analyzed the works of von Bertalanffy. This publication gave a boost to the system analysis in Russia. Sadovsky and Yudin continued the work in this field and in the mid-1960-s they have mostly parted ways with MMW and have started working together with Igor V. Blauberg (1929-1990) on philosophy and methodology of system research (Blauberg 1969; 1973; Blauberg, Yudin E. 1972; Blauberg, Sadovsky, Yudin E. 1967; 1977; Sadovsky, Yudin E. 1978; Yudin E. 1978; 1997).

4. Renaissance of Russian philosophy of technology in 1960-1970s and its development in 1980-1990-s

Despite noticeable successes of Russian engineers and scientists and a visible social respect to the profession of engineer, in Soviet Russia philosophy of tech-

nology was for long considered "bourgeois" discipline, which meant it was not worthy of Soviet thinker to pursue it. However different problems of technology were studied within several disciplines like history of technology, philosophical questions of technology, methodology and history of technical sciences, methodology and history of engineering etc. Methodology and system analysis as mentioned above was one of such "euphemisms".

1960-s saw the renaissance in all spheres of Russian philosophy that came with political and ideological *ottepel* ("the thaw") that followed Stalin's death. That was the time when philosophy of science truly flourished, naturally considering problems of philosophy of technology as well, but not bringing them in the vanguard. In 1970-s for the first time since Engelmeyer's works philosophy of technology has been virtually resurrected. A special Council on philosophy and social problems of science and technology of the USSR Academy of Science was created in 1970s and it was headed by prominent Russian philosopher of science Ivan T. Frolov (1929-1999) since 1980. The new stage was connected first and foremost with the names of Yuri S. Meleshchenko (1992-1972) and Boris I. Ivanov (born 1939) in Leningrad, Vladislav Cheshev (born 1940) in Tomsk, Vadim M. Rozin (one of Shchedrovitsky's followers, born 1937) and Vitaly G. Gorokhov (1947-2016) in Moscow, *et al*.

Yuri S. Meleshchenko has analyzed processes of technological development and especially technological and scientific revolutions, provided criticism of the technocratic societies (Meleshchenko 1964; 1970; 1987). Boris I. Ivanov's and Vladislav V. Cheshev works were dedicated to history and philosophy of technical sciences (Ivanov, Cheshev 1977), the epistemological and methodological specifics of the technical sciences and technical knowledge (Cheshev 1981; Ivanov 1997). Both Meleshchenko and Ivanov have worked in the Leningrad Branch of the Institute for the History of Science and Technology of the USSR (later – Russian) Academy of Sciences – it was one of the main institutions (with its head office in Moscow) where philosophy of technology was being developed. Later the center was shifted to the Institute of Philosophy of USSR (later – Russian) Academy of Sciences, with Vadim M. Rozin and Vitaly G. Gorokhov as central figures.

Vadim M. Rozin, being a follower of Shchedrovitsky's MMW has developed his own methodological and culturological approach to the problems of technology and technical sciences and provided the research into the origins and genesis of technology. Rozin has proposed four stages of development of technology. First stage is "anthropological" because at this point technology participates in the very making of human, the second stage is "empirical" and "sacral", the third – "engineering" and the fourth – "technological" in the broader sense (Rozin 1989). Together with Vitaly G. Gorokhov they have made a new step in institutionalization of this discipline – they published first textbooks in philosophy of technology in Russia (Gorokhov, Rozin 1998; Rozin, Gorokhov, Alekseeva, Aronson 1997; Gorokhov, 2007a), Gorokhov has also collaborated with prominent Russian philosophers of science Vyacheslav S. Stepin and Mikhail A. Rozov on the textbooks in philosophy of science and technology (Gorokhov, Rozov, Stepin 1995; 1996).

Irina Yu. Alekseeva (born 1956) was also a part of the research group working on philosophy of technology at the RAS Institute of Philosophy. Her earlier works were dedicated to the emerging computer technologies (Alekseeva 1993) and history of philosophy of technology and ethical questions of engineering (Alekseeva 1997a; 1997b), later her attention switched to the so-called convergent NBIC-technologies, information technologies and the questions of information society and knowledge society.

Another prominent figure of this period is Nadezhda G. Bagdasaryan (born 1947). Working in Bauman Moscow State University (former alma mater of Petr Engelmeyer) since 1969, she has created there in 1987 the Chair of sociology and culturology that became the first Chair of these disciplines in the structure of technical universities in Russia. She has devoted lots of her works to the problems of humanitarian education of engineers as an essential part of their professional culture (Bagdasaryan 1996; 1998). Bagdasaryan has also collaborated with Vitaly G. Gorokhov on many subjects, and they wrote textbooks together (Bagdasaryan, Gorokhov, Nazaretyan 2014). Bagdasaryan was also one of the principle organizers of the series of Engelmeyer Readings conferences in 1990s- early 2000-s, dedicated to the questions of philosophy of technology, engineer ethics, social and cultural aspects of technological development.

5. Philosophy of technology in the works of Vitaly G. Gorokhov

Probably the most important figure in the new period of Russian philosophy of technology was Vitaly G. Gorokhov (1947-2016). He was not only a link between the past of Russian philosophy of technology, rediscovering the works of Petr Engelmeyer and bringing attention to this important thinker, he was also the connecting link between all the researchers in the field of philosophy and sociology of technology and engineering in Russia, and also, working for a long time in the Karlsruhe Institute of Technology, he established strong ties between Russian and German specialists in this field.

Coming from the family of engineers, Vitaly Gorokhov has been at first considered by his parents and relatives a "black sheep" in his pursue of philosophy instead of technical disciplines. However, he has always maintained a special interest in the engineering profession and always spoke the same language with philosophers and engineers alike. He had closely collaborated with many technical universities – in particular Bauman Moscow State Technical University, where he, together with Nadezhda G. Bagdasaryan, has worked in the field of development the professional culture of the engineer students. His first books *Systems engineering and management* (Gorokhov 1979) and *Methodological analysis of systems engineering* (Gorokhov 1982) were dedicated to systems engineering (*systemotekhnika*). They were followed by several books both popular and scientific on the questions of the profession of an engineer – its emergence and development, the processes of the formation of professional societies of engineers and of the technical schools (Gorokhov 1987). He has thoroughly analyzed the history of philoso-

phy of technology in Russian and Germany, bringing back attention to the works of Petr Engelmeyer (Gorokhov 1997; 2001; 2009b).

Gorokhov continued his work well into the 2010-s, until his untimely death in 2016. His later research projects related to the problems of technoscience, nanotechnology, sociology of technology (Andreev, Gorokhov, Butirin 2009; Gorokhov 2009a) and social assessment of technology (Gorokhov 2000; 2003; 2004; 2007b; 2007c; 2012b; Gorokhov, Decker 2013; Gorokhov, Grunwald 2011; Gorokhov, Scherz 2011). He has demonstrated that nanoscience should be understood as nanotechnoscience because it uses both the methods of natural sciences and of technical sciences. Nanotechnologies, he claimed, are oriented towards both research of the natural phenomena and at the same time towards the artificial realization of some processes and design of the nanosystems, thus nanotechnoscience deals with special "natural-artificial systems" (Gorokhov 2009c; 2009d; 2009e; 2010; 2012d; 2013c; Gorokhov, Lenk 2009; Gorokhov, Stepin 2009).

Gorokhov has always had an interest in historical research of science and technology. A comprehensive history of the development of technical sciences was given by him in his 2012 book "Technical Sciences: History and Theory (The History of Science from the Point of View of Philosophy" (Gorokhov 2012c). Apart from this opus and his works on Engelmeyer, he was also interested in the period of the emergence of modern natural science in the works of Galileo Galilei (Gorokhov 2011; 2012a; 2013a; 2014; 2015), whom he considered to be the originator of technoscience and first philosopher of technology, even one of the first technology assessment experts (Gorokhov 2013b). One of his latest research projects was called *From Galilei's technoscience to technoscience* and Gorokhov took his time to specially visit some places connected with the work of Galilei in Padua, Pisa, Florence etc.

6. Philosophy of technology in the present Russia

Currently the work in philosophy of technology is continued by Vadim M. Rozin (Rozin 2001; 2006), Irina Yu. Alekseeva (Alekseeva 2013; Malyuk, Polyanskaya, Alekseeva 2016; Alekseeva, Arshinov 2016), Nadezhda G. Bagdasaryan (Bagdasaryan, Gavrilina 2011), Andrei A. Voronin (Voronin 2006) in Moscow, Boris I. Ivanov (Ivanov 2009) in Saint-Petersburg, Vladislav V. Cheshev (Cheshev 2006) in Tomsk. A younger generation of philosophers of technology – former students of Vitaly G. Gorokhov continue their work in the steps of Gorokhov, especially in the field of technology assessment, continuing the collaboration with Karlsuhe Institute of Technology – Institute for Technology Assessment and Systems Analysis (Chernikova, Seredkina, Cheshev, Sitnikova, Platonova, Ivanova, Grunwald 2015) – Dmitry V. Efremenko (Efremenko 2002; Efremenko, Giryaeva, Evseeva 2002), Elena A. Gavrilina (Bagdasaryan, Gavrilina 2011; Grunwald, Gavrilina, Gorokhova A., Gorokhova G., Efimenko 2011; Gavrilina 2015) *et al.*

Historical aspects of philosophy of technology are also developed by Alexander V. Mikhailovsky (Mikhailovsky 2011; 2013; 2016; 2017; 2018) in Moscow and Natalia V. Popkova (Popkova, 2007; 2008; 2012) in Bryansk.

A new field within philosophy of technology has emerged in 2000-s due to the successes of the biotechnologies. Boris G. Yudin (1943-2017), younger brother of Erik G. Yudin (see above), a specialist in ethics of science and bioethics, has become one of the pioneers in this field, promoting the idea of philosophy as humanitarian expertise of technological and biotechnological problems (Yudin B., Lukov 2006; Yudin B. 2007b; 2014; 2015; Tishchenko, Yudin B. 2017). His later interest was related to the problems of human biotechnological "enhancement" and "transhumanism" program (Yudin B. 2007a; 2013; 2016]. His work in 2000-s was realized in the Department of Humanitarian Expertise and Bioethics of the Institute of Philosophy of the Russian Academy of Sciences, together with his colleagues (Pavel D. Tishchenko (Tishchenko 2001) and former students (Popova 2017) *et al.*

In May 2017 the conference "*Philosophy and sociology of technology in the 21st century*" was organized in honor of Vitaly Gorokhov and to the 70th anniversary of his birthday (Alekseeva, Kostikova, Yakovleva (eds.) 2018). It was a big international and multidisciplinary event that showed great interest in these problems existing in different scientific directions. This was the first of Gorokhov Readings that are supposed to become bi-annual conference. Another scientific heritage of Vitaly Gorokhov is the journal "*Philosophy of Science and Technology*", a journal, conceived by prominent Russian epistemologist Vladislav A. Lektorsky and Gorokhov, where Gorokhov was a deputy editor-in-chief for two years, putting a great effort into the organization of the journal, bringing all the main specialists in philosophy of technology in Russia to its editorial board.

Current philosophy of technology in Russia is an interdisciplinary field of research – a point of meeting of specialists from technical, social, natural sciences and humanities. It is often integrated in the broader STS programs or technology assessment initiatives. The present agenda of digitalization of the human environment is sure to call for the new challenges that bring philosophy of technology to the vanguard, set new goals and bring to life new research programs in this field.

References

Alekseeva I. Yu.

1993 *Chelovecheskoe znanie i ego komp'juternyj obraz (Human knowledge and its computer image)*. Moscow.

1997 *Amerikanskaja filosofija tehniki v konce XX veka* (*American philosophy of technology in the end of XX century*), *Voprosy istorii estestvoznanija i tehniki* (*Questions of history of natural sciences and technology)*, No. 1.

1997 *Obsuzhdenie problem inzhenernoj jetiki v Rossii v nachale XX veka* (*Discussion on the problems of engineering ethics in Russia in the beginning of the XX century*), *Inzhenernaja jetika v Rossii i SShA: Istorija i social'no-politicheskij kontekst (Engineering ethics in Russia and USA: History and social and political context)*. Moscow.

2013 *Chto takoe obshhestvo znanij?* (*What is a Knowledge Society?*). Moscow, 2013. (in Russian)

Alekseeva I.Yu., Arshinov V.I.
2016 *Informacionnoe obshhestvo i NBIKS-revoljucija (Information Society and NBICS-revolution).* Moscow: IF RAN.

Alekseeva, Kostikova, Yakovleva (eds.)
2018 *Filosofija i sociologija tehniki v XXI veke. K 70-letiju V.G. Gorokhova (Philosophy and sociology of technology in 21st century. To the 70th anniversary of V.G.Gorokhov)*, Moscow: Aquilon,, 432 pp.

Andreev A.L., Gorokhov V.G., Butirin P.A.
2009 *Sociologija tehniki. Uchebnoe posobie (Sociology of technology. A Handbook)*. Moscow: Alfa-M; Infra-M.

Bagdasaryan N.G.,
1996 *Vysshaja tehnicheskaja shkola v prostranstve kul'tury (sociologija i filosofskie problemy) (Higher technical education in the space of culture (sociology and philosophical problems)*. Moscow.
1998 *Professional'naja kul'tura inzhenera: mehanizmy osvoenija (Professional culture of the engineer: mechanisms of mastery).* Moscow.

Bagdasaryan N.G., Gavrilina E.A.
2011 *Kul'turologija tehniki i inzhenernoj dejatel'nosti (Cultural studies of technology and engineering activity)*. St. Petersburg, 2011.

Bagdasaryan N.G., Gorokhov V.G., Nazaretyan A.P.
2014 *Istorija, filosofija i metodologija nauki i tehniki. Uchebnik dlja magistrov (History, philosophy and methodology of science and technology. Textbook for M.A. students)*, ed. by N.G.Bagdasaryan. Moscow: Urait Publ., pp. 383.

Berdyaev N.A.,
1993 *Chelovek i mashina* (*Problema sociologii i metafiziki tehniki*) (*The Human and the Machine* (*the problem of sociology and metaphysics of technology*), *Put' (The Path)*, No. 38, pp. 3-38.

Blauberg I.V.,
1969 *Sistemnyj podhod: predposylki, problemy, trudnosti (System approach: backgrounds, problems, difficulties)*. Moscow.
1973 *Stanovlenie i sushhnost' sistemnogo podhoda (Emergence and essence of system approach).* Moscow, 1973.

Blauberg I.V., Yudin E.G.
1972 *Ponjatie celostnosti i ego rol' v nauchnom poznanii (The concept of integrity and its role in scientific cognition).* Moscow, 1972.

Blauberg I.V., Sadovskiy V. N., Yudin E. G.

1967 *Sistemnyj podhod v social'nyh issledovanijah* (*System approach in social research*), *Voprosy filosofii*, No. 9.
1977 *Systems theory. Philosophical and methodological problems*. Moscow.
1978 *Filosofskij princip sistemnosti i sistemnyj podhod* (*Philosophical principle of system quality and system approach*), *Voprosy filosofii*, No. 8.

Bogdanov A.A.
1922 *Tektologiya: Vseobschaya Organizatsionnaya Nauka (Tektology: the General Science of Organization). In 3 Vol.* Berlin and Petrograd-Moscow. (English translation: Bogdanov A. *Essays in Tektology: The General Science of Organization*, trans. George Gorelik, Seaside, CA, Intersystems Publications, 1980.)

Bulgakov S.N.
1912 *Filosofija hozjajstva (Philosophy of household)*. Moscow: Put'.

Chernikova I.V., Seredkina E.V., Cheshev V.V., Sitnikova D.L., Platonova A.V., Ivanova N.A., Grunwald A.
2015 *Tehnonauka i social'naja ocenka tehniki (filosofsko-metodologicheskij analiz) (Technoscience and technology assessment (philosophical and methodological analysis)*. Tomsk.

Cheshev V.V.,
1981 *Tehnicheskie nauki kak ob'ekt metodologicheskogo analiza (Technical Sciences as the* 2006 *Object of Methodological Analysis).* Tomsk: Tomsk University Publications. (in Russian)
Tehnicheskoe znanie (Technical knowledge). Tomsk: Tomskij gosudarstvennyj arhitekturno-stroitel'nyj universitet,

Efremenko D.V.
2002 *Vvedenie v ocenku tehniki* (*Introduction to the technology assessment)*. Moscow, 2002. (in Russian)

Efremenko D.V., Giryaeva V.N., Evseeva Y.V.
2012 *NBIC-konvergencija kak problema social'no-gumanitarnogo znanija* (*NBIC-convergence as a problem of social and humanitarian knowledge*), *Epistemology & Philosophy of Science*, Vol.34, No. 4, pp. 112-129.

Engelmeyer P.K.
1893 *Ueber das Entwerfen der Maschinen. Psychologische Analyse*, *Civielingenieur,* Bd. 39, H. 7.
1894 *Grundriss der Philosophie der Technik*, *Koelnische Zeitung*, No. 605, 608.
1985 *Das Erfinden*, in *Koelnische Zeitung,* 1895, Febr. 15, 16, 18. Nr. 138, 141, 147. (in German)
1895 *"Was ist eine Erfindung"*, in *Civielingenieur*, 1895, Bd. 61, H. 4. (in German)
1898 *Kritika nauchnyh i hudozhestvennyh uchenij gr. L.N. Tolstogo (The critique of scientific and artistic teachings of count L.N.Tolstoy).* Moscow, 1898. (in Russian)
1898 *Tehnicheskij itog XIX veka (Technical sum of the XIX century).* Moscow: tip. K.A.Kaznacheeva, 1898., p. 107 ss.

1899 *Allgemeine Fragen der Technik*, in *Dinglers Polytechnisches Journal*, Bd. 312, H. 7, S. 97.
Izobretenija i privilegii: Rukovodstvo dlja izobretatelej so vstupit. pis'mom gr. L.N. Tolstogo (*Inventions and privileges: a manual for the inventors with the introductory letter of count L.N.Tolstoy*). 2-nd ed. Moscow: tip. G. Lissnera i A. Geshelja, 1900. Pp. XII+306 ss.
1900 *Philosophie der Technik, eine neue Forschungsrichtung*, in *Prometheus,* 1900, No. 564/565.
1910 *Teorija tvorchestva. (Theory of creativity).* St.Petersburg: Obrazovanie, 1910., p. 210 ss.
1911 *Tvorcheskaja lichnost' i sreda v oblasti tehnicheskih izobretenij (Creative person and the environment in the sphere of technical inventions).* St.Petersburg: Obrazovanie, p. 116 ss.
1911 *Philosophie der Technik*, *Ann. IV Congresso Internationale de Philosofia,* Bologna, Vol. 3.
2012 *Filosofija tehniki. Vyp. 1-4 (Philosophy of technology. Iss.1-4),* Moscow: T. vo skoropechatni A.A. Levenson.
1913 *Zadachi filosofii tehniki* (*Goals of the philosophy of technology*), in *Bjulleteni politehnicheskogo obshhestva (Polytechnical society bjulletens)*, no. 2. St.Petersburg: Imp. tehn.uchilishhe, pp. 113 ss. (in Russian)
1914 *Jevrologija, ili Vseobshhaja teorija tvorchestva* (*Eurology, or the Universal theory of creativity*), in *Voprosy teorii i psihologii tvorchestva (The questions of theory and psychology of creativity)*. Kharkov, Vol. 5, pp. 131-160.
1925 *Kak nado i ne nado izobretat. Konspekt lekcij s diapozitivami (How one should and how one should not invent. Lecture notes with diapositives).* Moscow.

Florensky P.A.
2000 *U vodorazdelov mysli* (*At the watersheds of thought*), in Florensky P.A. *Sochinenija v chetyreh tomah (Collection in four volumes)*., Vol. 3, Book 1. Moscow: Mysl', 2000, pp. 621 ss. (in Russian)

Gavrilina E.A.
2015 *Engineering creativity: an essay on epistemological analysis*, in *History of Mechanism and Machine Science*, Vol. 27, pp. 195-205.

Gorelik G.
1987 *Bogdanov's «Tektology», General System Theory and Cybernetics*, in *Cybernetics and Systems: An International Journal*, Vol.18, No.2, pp. 157-175.
1979 *Sistemotehnika i upravlenie (Systems engineering and management).* Moscow: Znanie, 1979. (in Russian)
1982 *Metodologicheskij analiz sistemotehniki (Methodological analysis of systems engineering).* Moscow: Radio i svjaz'.
1987 *Znat', chtoby delat' (Istorija inzhenernoj professii i ee rol' v sovremennoj kul'ture)* (*To Know In Order To Do (A History of the Engineering Profession and its Role in Modern Culture*). Moscow: Znanie, 1987. (English translation: Gorokhov V. *Engineering: Art and Science*. Moscow: MIR, 1990).
1997 *Russkij inzhener i filosof tehniki Petr Kliment'evich Jengel'mejer (1855-1941) (Pyotr Klimentyevich Engelmeier: Russian Engineer and Philosopher of Technology (1855-1941)*). Moscow, Nauka.

2000 *Scientific and Technological Progress, Democracy, Participation and Technology Assessment in Russia*, in *Towards the Information Society. The Case of Central and European Countries*. Berlin, Heidelberg: Sringer-Verlag.

Gorokhov V.

2001 *Technikphilosophie und Technikfolgenforschung in Russland*. Bad Neuenahr-Ahrweiler: Europaeishe Akademie, pp. 71 ss. URL: https://www.eaaw.de/fileadmin/downloads/Graue_Reihe/GR_26_TechnikphilosophieRussland_022001.pdf.

2003 *A New Dimension of Technology Assessment in the e-Society in Russia*, in *Yearbook 2003 of the Institute for Advanced Studies on Science Technology and Society*. Wien: Profil.

2004 *Technikfolgenabschätzung als Systemanalyse*, in *Technik – System – Verantwortung*, Hrsg. von K. Kornwachs, *Technikphilosophie,* Bd. 10. Münster: Lit Verlag.

2007a *Osnovy filosofii tehniki i tehnicheskih nauk (Foundations of philosophy of technology and technical sciences)*. Moscow: Gardariki,

2007b *Philosophy of Technology as a Theory of Technological Assessment. The Problem of the Rational Analysis and Description of Technological Activity*., in: *Technological and Environmental Policy. Studies in Eastern Europe*, ed. by. G. Banse. Berlin: edition sigma, pp. 43-73.

2007c *Technology Assessment in the Risk Society*, in: *Technologies and Threats of the 21-st Century: physical, biological, informational and social aspects. Proceedings of the Humbolt Kolleg*, ed. by A.S. Sidorenko. Chisinau: Academy of Sciences of the Moldova Republic.

2009 *Genezis tehnicheskoj dejatel'nosti kak predmet sociologicheskogo analiza (The Genesis of Technical Activities as the Subject of Sociological Analysis)*, Moscow: Gumanitariy.

Gorokhov, 2009b – Gorokhov V.G.

2009 *Tehnika i kul'tura. Vozniknovenie filosofii tehniki i teorii tehnicheskogo tvorchestva v Rossii i Germanii v konce XIX – nachale HH stoletija (sravnitel'nyj analiz) (Technology and culture. The emergence of the philosophy of technology and the theory of technical creativity in Russia and Germany at the end of 19th – beginning of XX century (comparative analysis))*. Moscow: Logos, 375 pp.

2009a *Methodological problems of nanotechnoscience*, in: *Nanoscale Phenomena – Fundamentals and Applications*, ed. By Horst Hahn, Anatoli Sidorenko, Ion Tiginyanu. Heidelberg, Frankfurt/Main: Springer.

2009b *Nanoethics as a Combination of Scientific, Technological and Economic Ethics*, in: *The Social Sciences and Humanities: Research Trends and Collaborative Perspectives*. Moscow: ISS RAS.

2009c *The Natural and the Artificial from Galileo to Nanotechnology*, in: Gotthard Bechmann, Vitaly *The Social Integration of Science. Institutional and Epistemological Aspects of the Transformation of Knowledge in Modern Society*. Berlin. Edition Sigma.

2010a *Nanotechnoscience. A new Theory of Modern Technology*, in *The International Journal of Technology, Knowledge and Society*, Vol. 6, Nr. 4.

2010b *Tehnonauka Galileo Galileja: razmyshlenija po povodu knigi Mateo Valeriani Galileo,* in M. Valleriani, *Galileo engineer*, Dordrecht, Heidelberg, London, New York: Springer, *Voprosy filosofii*, 2013, No. 1, pp. 105-116. (in Russian)

2011 *Scientific and technological progress by Galileo*, in: Busche, H. (Hrsg.): *Departure for modern Europe. A Handbook of early modern philosophy (1400-1700)*. Hamburg: Felix Meiner, pp. 135-147.

2012a *Galileo Galilej kak filosof tehniki (sociokul'turnyj podvig, kotoryj izmenil mir)* (*Galileo as philosopher of technology (socio-cultural achievement that changed the world*), *Filosofskii zhurnal /Philosophy Journal*, No. 1, pp. 59-76. (in Russian)

2012b *Social'naja ocenka tehniki kak social'no-gumanitarnaja tehnologija* (*Technology assessment as a social-humanitarian technology*), in: *Obshhestvo. Tehnika. Nauka. Na puti k teorii social'nyh tehnologij (Society. Technology. Science. On the way to the theory of social technologies)*, ed.by I.T.Kassvin. Moscow: Alfa-M, pp. 336–366.

2012c *Tehnicheskie nauki: istorija i teorija (istorija nauki s filosofskoj tochki zrenija)* (*Technical Sciences: History and Theory (The History of Science from the Point of View of Philosophy*). Moscow: Logos.

2012d *Nanotechnology as Combination of the Natural and Engineering Sciences*, in *Philosophy Study*, Vol. 2, No.4.

2013a *Galileo Galilei as Philosopher of Technology and Technology Assessment Expert*, in *Philosophy: Theory and Practice. Russian Academy of Sciences*, ed. by V. Sharova, E. Trufanova, A. Yakovleva. Moscow: IF RAN.

2013b *The Roots of the Theoretical Models of the Nanotechnoscience in the Electric Circuit Theory*, in *Advances in Historical Studies*, 2013, Vol.2/No.2, pp 19-31. Published Online June 2013c in SciRes (http://www.scirp.org/journal/ahs).

2013d *Social'nye tehnologii prikladnyh mezhdisciplinarnyh issledovanij v sfere social'noj ocenki tehniki* (*Social technologies of applied interdisciplinary research in the field of technology assessment*), in *Epistemology & Philosophy of Science*, Vol. 35, No.1, pp. 135-150.

2014 *GALILEO: the origins of the scientific–technological knowledge,* in *the Section "1964–2014. Hommage to Alexandre Koyré. Hypotheses, perspectives & popularization within history of science"*, *The 6th International Conference of the European Society for the History of Science*, Lisbon, 4-6 September 2014. http://eshs2014.ciuhct.com/abstracts/5_GOROKHOV_Galileo.pdf

2015 *Ballistika Nikkolo Tartal'i, tehnonauka Galileja i nanotehnonauka: aristotelevskaja fizika skvoz' veka* (*Ballistic of Niccolo Tartaglia, Galilean Technoscience and Nanotechnoscience: Physics of Aristotle Through the Centuries*), in *Filosofiya nauki I techniki (Philosophy of Science and Technology)*, 2015, Vol.20, No.1, pp.7-35. (in Russian)

Gorokhov G., Grunwald A.

2011 *Kazhdaja innovacija imeet social'nyj harakter! (Social'naja ocenka tehniki kak prikladnaja filosofija tehniki)* (*Any innovation has a social character!* (*Technology assessment as an applied philosophy of technology*), in *Vysshee obrazovanie v Rossii*, No. 5, pp.135-145.

Gorokhov V., Lenk H.

2009 *NanoTechnoScience as a Cluster of the Different Natural and Engineering Theories and Nanoethic*s, in: *Silicon vs Carbon: Environmental and Biological Risks of Nanobiotechnology, Nanobionics and Hybrid Organic-Silicon Nanodevices*. Freiburg/Munich. Springer, pp. 190–213.

Gorokhov V.G., Rozin V.M.

1998 *Vvedenie v filosofiju tehniki (Introduction to the philosophy of technology)*. Moscow: INFRA-M.

Gorokhov V.G., Rozov M.A., Stepin V.S.

1995 *Filosofija nauki i tehniki. Uchebnoe posobie (Philosophy of science and technology. A Handbook)*, Moscow: Kontakt-Alfa, 1995.

1996 *Filosofija nauki i tehniki. Uchebnoe posobie (Philosophy of science and technology. A Handbook)*. Moscow: Gardarika.

Gorokhov V., C. Scherz C.
2011 *Der (Nicht-)Umgang mit Technikfolgen in Russland*, in: *Fallstudien zur Ethik in Wissenschaft, Wirtschaft, Technik und Gesellschaft. Serie Schriftenreihe des Zentrums für Technik- und Wirtschaftsethik an der Universität Karlsruhe (TH)*. Hrsg. von Matthias Maring. Karlsruhe, Verlag KIT Scientific Publishing, S. 167-175. (in German)

Gorokhov V., Stepin V.
2009 *Nanotechnology: Perspective for Future and Nanorisks*, in *Silicon vs Carbon: Environmental and Biological Risks of Nanobiotechnology, Nanobionics and Hybrid Organic-Silicon Nanodevices*. Freiburg/Munich: Springer, pp. 242–261.

Grunwald A., Gavrilina E.A., Gorokhova A.V., Gorokhova G.V., Efimenko D.E.
2011 *Tehnika i obshhestvo: zapadnoevropejskij opyt issledovanija social'nyh posledstvij nauchno-tehnicheskogo razvitija (Technology and society: West European experience of the research of social effects of the scientific and technological development)*. Moscow.

Ivanov B.I.
1997 *Filosofskie problemy tehnoznanija (Philosophical problems of technical knowledge)*. St.Petersburg: Institut istorii estestvoznanija i tehniki; Sankt-Peterburgskij filial, 1997.
2009 *Filosofskie problemy tehnoznanija* (*Philosophical problems of technical knowledge)*, Petrozavodsk.

Ivanov B.I., Cheshev V.V.
1977 *Stanovlenie i razvitie tehnicheskih nauk (Emergence and development of technical sciences).* Leningrad: Nauka.

Lektorsky V.A., Sadovsky V.N.
1960 *O principah issledovanija sistem* (*On the principles of system research*), *Voprosy filosofii*, No. 8, pp.67-79. (in Russian)

Loktionov M.V.,
2016 *A.A.Bogdanov kak osnovopolozhnik obshhej teorii sistem* (*Alexander Bogdanov – the founder of the General systems theory*), in *Filosofiya nauki I techniki*, 2016, Vol. 21, No.2, pp. 80-96.

Malyuk A.A., Polyanskaya O.Yu., Alekseeva I.Yu.
2016 *Jetika v sfere informacionnyh tehnologij (Ethics in the sphere of information technologies)*. Moscow.

Meleshchenko Yu.S.
1964 *Chelovek, obshhestvo i tehnika (Human, society and technology)*. Leningrad: Lenizdat.
1970 *Tehnika i zakonomernosti ee razvitija (Technology and the laws of its development)*. Leningrad: Lenizdat.
1987 *Tehnicheskij progress i ego zakonomernosti (Technical progress and its laws)*. Leningrad: Lenizdat.

Mikhailovsky A.V.,
2011 *Filosofija tehniki Hansa Frajera* (*Philosophy of technology of Hans Freyer*), *Voprosy filosofii,* 2011, No.3, pp. 62-72. (in Russian)
2013 *Svoboda tehniki? K ponimaniju tehniki u Jernsta i Fridriha Georga Jungerov* (*Freedom of technology? Towards the understanding of technology in works of Ernst and Friedrich Georg Junger*)', in *Filosofskie nauki*, 2013, No.7, pp.79-95. (in Russian).
2016 *Hajdegger i Aristotel' o Techne i Physis. Stat'ja pervaja. Germenevticheskoe znachenie Aristotelja dlja formirovanija hajdeggerovskoj mysli o tehnike* (*Heidegger and Aristotle on Techne and Physis. First part. Hermeneutical significance of Aristotle in formation of Heidegger's idea of technology*), *Vestnik RGGU. Serija: Filosofija. Sociologija. Iskusstvovedenie*, No.3 (5), pp. 37-51.
2017 *Hajdegger i Aristotel' o techne i physis. Ctat'ja vtoraja.* "*Podlinnaja tehnika*" (*Heidegger and Aristotle on Techne and Physis. Second part*)', *Vestnik RGGU. Serija: Filosofija. Sociologija. Iskusstvovedenie*, No.1(7), pp. 36-46.
Inzhenernaja dejatel'nost' i tehnicheskaja forma zhizni (*Engineering activity and technological "form of life*), in *Filosofiya nauki I techniki (Philosophy of Science and Technology)*, 2018, Vol. 23, No.1, pp.29-42. (in Russian)

Popkova N.V.
2007 *Vvedenie v filosofiju tehniki. Uchebnik (Introduction into philosophy of technology. Textbook)*. Bryansk.
2008 *Filosofija tehnosfery (Philosophy of technosphere*, Moscow.
2012 *Antropologija tehniki: problemy, podhody, perspektivy (Anthropology of technology: problems, approaches, perspectives)*. Moscow, 2012.
2017 *Chelovek kak artefakt biotehnologij (Human as an artefact of biotechnologies)*. Moscow: Kanon+Reabilitazia.

Rozin V.M.
1987 *Specifika i formirovanie estestvennyh, tehnicheskih i gumanitarnyh nauk (The Specific Nature and Formation of Natural and Technical Sciences as well as Humanities)*. Krasnoyarsk, Krasnoyarsk University Publications.
2001 *Filosofija tehniki. Uchebnik dlja vuzov* (*The Philosophy of Technology. A textbook for tertiary education facilities*). Moscow, Nota Bene, 2001.
2006 *Ponjatie i sovremennye koncepcii tehniki* (*The Notion and the Contemporary Conceptions of Technology*). Moscow, RAS IPh.
2017 *The Moscow Methodological Circle: Its Main Ideas and Evolution*, *Journal Social Epistemology. A Journal of Knowledge, Culture and Policy,* Vol. 31, Iss.1: Russian Philosophy of Science, Guest Editor: Ilya Kasavin, pp. 78-92.

Rozin V., Gorokhov V., Alekseeva I., Aronson O.
1997 *Filosofija tehniki: istorija i sovremennost' (Philosophy of technology: history and present)*. Moscow.

Sedykh O.M., Khamenkov V.A.
2016 *Organoproekcija: russkij kontekst* (*Organ Projections: Russian Context*)', *Filosofiya nauki i tekhniki*, Vol.1, pp. 132-151.

Shchedrovitsky G. P.,
1995 *Izbrannye trudy* (*Selected Works*). Moscow, Shkola kulturnoi politiki.

1996 *Filosofija. Nauka. Metodologija (Philosophy. Science. Methodology).* Moscow, Shkola kulturnoi politiki.

Tischenko P.D.
2001 B*io-vlast' v jepohu biotehnologij (Bio-power in the age of biotechnologies)*. Moscow: IF RAN.

Tishchenko P.D., Yudin B.G.,
2017 *Sociogumanitarnoe soprovozhdenie innovacionnyh biotehnologicheskih proektov* (*Sociohumanitarian accompaniment of innovational biotechnological projects*), *Biojetika i biotehnologii: predely uluchshenija cheloveka: sb. nauch. st. K 70-letiju P.D. Tishchenko (Bioethics and biotechnologies: the limits of human enhancement. Scientific papers collection to P.D. Tishchenko's Anniversary)*. Moscow: MosGU, pp. 209-237.

Voronin A.A.
2006 *Mif tehniki (The Myth of Technology).* Moscow.

Yudin B.
2007 *Creation of a Transhuman*, in *Herald of the Russian Academy of Sciences*, vol. 77, no.3, p. 247-253.
2007 *Interrelations between Bioethics and Ethics of Biotechnology, Ethics in Biomedical Research: International Perspective,* ed. by Matti Hayry et al. Rodopi. Amsterdam – NY., pp. 125-132.
2013 *Transhumanism: is it overhumanism or antihumanism?*', *Humanitarian Expertise and bioethics.* Moscow.
2014 *Social'nyj kontekst nanotehnologicheskih proektov* (*Social context of nanotechnological projects*), in *Razvitie nanotehnologij kak social'nyj proekt (The development of nanotechnologies as a social project),* ed. by B.G.Yudin. Moscow: MosGU, pp. 3-30.
2015 *Transdisciplinarnyj harakter gumanitarnoj jekspertizy* (*Transdiciplinary character of humanitarian expertise*), *Transdisciplinarnost' v filosofii i nauke. Podhody. Problemy. Perspektivy* (*Transdisciplinarity in philosophy and science. Approaches. Problems. Perspectives).* Moscow: Navigator, pp. 319-333.
2005 *Tehnonauka i «uluchshenie» cheloveka* (*Technoscience and the human "enhancement'*), in *Epistemology & Philosophy of Science,* Vol. XLVIII, No. 2, pp.18–27.

Yudin B.G., Lukov V.A.
2006 *Gumanitarnaja jekspertiza. K obosnovaniju issledovatel'skogo proekta (Humanitarian expertise. Towards the justification of the research project).* Moscow.

Yudin E.G.
1978 *Sistemnyj podhod i princip dejatel'nosti: Metodologicheskie problemy sovremennoj nauki (System approach and principle of activity: methodological problems of modern science).* Moscow: Nauka, 1978, pp. 391
1997 *Metodologija nauki. Sistemnost'. Dejatel'nost' (Methodology of science. System quality. Activity).* Moscow: URSS, 1997, pp. 444 ss.