

Anatoli Unitsky

InGENIUM

THE WORLD AS AN ENGINEERING PROJECT



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The modern world was created by engineers. The technologies they develop determine not only everyday life but also the way of science and culture development as well as the Earth's appearance and the state of nature. However, the society management is given into the hands of politicians and entrepreneurs, while engineers only serve their interests dictated by power and profit. Environmental problems of the 21st century, wars, economic inequality and social injustice are the result of almost limitless possibilities achieved by engineering while maintaining its moral neutrality established in previous eras.

Based on extensive historical and philosophical material along with data from exact sciences, statistics and sociological research, the author assesses the role of engineers in the formation of our technocratic civilization in a new way. He carries out the analysis of the sociopolitical system of the 21st century as well as the logic of its formation and the image of a rational future built on its basis from an engineering point of view. He also studies value aspects of engineering activity along with fundamentals of ideological and industrial approaches corresponding to the level of technology development achieved at the time of writing this book as well as current global environmental, demographic and industrial challenges.

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1. FORMATION OF THE TECHNOSPHERE

1.1. Engineers Created Our World

Our world was created by engineers. The modern civilizational world as we know it became possible only through engineering. It was the work of thousands of generations of nameless engineers over millennia that created the objects, systems and technologies surrounding us every day. From stone axe, fire, wheels, nail and bolt to car, airplane, iPhone, power plant and spaceship, all of these are products of the engineer intellectual work. Only engineering and technological advances have made it possible for humanity to take a dominant position among the millions of living beings that inhabit our planet. If you turn off electricity, heating and sewage, stop factories and plants – the world will quickly plunge into a primitive state. It is no exaggeration to say that without engineering devices there would be no politics, no art, no religion, no state, no society and no other form of social and spiritual life.

Human civilization differs from other terrestrial civilizations, for example, from such a purely biological civilization as dolphins. They occupied a biological niche in the biosphere, which had remained unchanged for millions of years. They do not have technocracy, science, art and the problems associated therewith. Although humans and dolphins are somewhat similar, as those marine mammals differ from other animals by their high intellect. Besides, they have their language, even more complex than that of humans, so it is possible that their intelligence may be higher as well.

Our civilization, unlike other terrestrial societies, is a technocratic (technogenic) social system, the genesis of which is based on the development of science, engineering, technology and production as well as the extremely urbanized environment formed around



Engineers
of the whole World,
unite!

AO

these systems – inanimate (industrial) technosphere, which occupies the same natural niche on our planet as the biosphere – not only the surface of the planet but also many kilometers of sea and land depths and the lower part of the atmosphere. And this alien to earthly life technosphere exists and develops according to approximately the same antagonistic principles as, for example, a cancer cell in a living organism, which is booming due to the suppression and destruction of healthy cells. And only two scenarios are possible: either the body's immune system kills cancer or cancer defeats the body and then dies itself.

The engineering technologies (not the natural biological ones) have been formed according to the laws of macroworld (not of the micro- or digital world, i.e., physics and not of philosophy and society). These technologies have created (in a very short time by historical standards) the modern human technogenic civilization.

When our ancestors were hunters and gatherers, they had only the most primitive tools at their disposal. Because of limited resources, with their own effort one person could only feed themselves. If things worked out well, there was something left for the kids. Nothing more. This is why slavery was impossible for a long time. Slaves must work hard to provide necessary things for at least two – themselves and their master. There was much to learn, much to discover, to tame animals and to invent plow.

Marxist teaching about the base and superstructure grasp an important side of civilization development. Any significant transformation of society is linked to changes in the so-called productive forces and, above all, in the tools of labor along with technologies that meet people's needs. I do not share the belief in the primacy of the base over the superstructure. In my opinion, this is too simplistic. Its falsity is disputed by a lot of facts. For example, the October Revolution, which supposedly led to the establishment of a new formation, was much more influenced by the processes that took place in the minds of people as well as in the culture and politics of that time. Russia remained a predominantly agrarian country. The proletariat was a tiny minority. Nevertheless, their dictatorship was proclaimed. Also, there's a well-received theory of postindustrial

society that has the service sector, not industry, in its focus. The transition to such a state is also difficult to relate to the transformations taking place in the base. But it remains true that every significant change is provided by some technology created by engineers. All spheres of life and the nature of people's views are mediated by the same thing.

For a 21st century human it turns out to be normal to comprehend themselves and even to build corresponding anthropological theories in the terminology of cybernetics. People, for example, talk about their memory by counting it in gigabytes and think about health using words borrowed from video games such as "health point". They describe mental states, resorting to "crashing", "lagging", "bugging" and other terms. The world and God are interpreted by analogy with computer programs and programmer activities. Sometimes it gets funny. However, more often there are tragic consequences, as in the case of Adam Lanza, who shot 26 people, feeling like a computer game character in pursuit to "score as many points as possible". At the same time, there is nothing unique in the description. We have always considered the reality in one way or another in relation to the achieved level of technology. Engineering solutions often proved to be the key to thinking.

1.1.1. How Does Religion Owe Engineers?

In the 17th-18th centuries with the flourishing of mechanics, people were describing themselves and everything around them as mechanisms. Julien Lamettrie wrote a book titled "Human a Machine". The Deists painted the Universe as a sort of a giant clock, set by God. Even earlier, with the appearance of the first religious teachings on how God had created human and the world, this reasoning came through the metaphor of pottery. The idea that human is made of clay came only after the invention and distribution of the potter's wheel. The already mentioned plow and general development of agriculture gave rise to many religions that perceive the origin of everything uniting the masculinity of the sky and the feminine principle of the earth. The land is plowed over

with a plow serving as a phallic symbol in Sigmund Freud's terminology, and after that it produces a crop. In almost all agrarian cultures, land is described as a female, a mother-breadwinner, etc. The beliefs of peoples who have not drifted away from the life of hunters and gatherers are usually associated with the worship of forest spirits, sacred animals and so on. Unaware of the technology of growing vegetables and fruits, they often do not even understand the causes and mechanisms of impregnation, do not link pregnancy with making love.

In the history of religion, one can find many examples referring to the use of technical innovations in religious practices. Ritual dancing with a tambourine around a campfire or lighting a pipe of peace – all of it belongs to technological innovations that dolphins lack, as well as most likely they do not have religion. One can also cite as an example the use of techniques for the replication of sacred texts. Religious books were created thanks to technical innovations in writing, such as brushes, mastic, parchment, paper and printing. Construction techniques and technologies, such as stone cutting and wood processing along with manufacture of bricks and binding materials, played a major role in creating architecture for religious sites and shrines. Churches, temples and mosques are defined by architectural styles that have emerged due to technical innovations in construction. Glass founding and stone machining as well as the possibilities of melting and forging metals allowed religious leaders and architects to create impressive and complex architectural objects.

There are even more examples of how technology impacts thinking, but in this section it is enough to assert that the religious worldview correlates with the level of technical development of the epoch. Believers and religious figures, just like nonbelievers, wear clothes and shoes, use cars, airplanes, computers, iPhones and the internet. In addition, it is only necessary to point out one more circumstance – the weakening of the religion role in society is associated with the strengthening of the technological equipment of humankind. At the same time, the place of religious experience does not remain empty. For answers that were previously sought in church, the 21st century people increasingly turn to search engines like Google.



Let us leave this here as an invitation to reflection and go further, analyzing how the development of technology influenced the formation of philosophy and science. It may seem that the direct connection is obvious. But this is not quite true.

Engineering gave more for the development of civilization than science did, although there is a directly opposite point of view. In science, you don't need to invent something, in science you need to discover what already exists in nature, regardless of our consciousness and understanding, for example, the discovery of volcanism on the Moon or radio waves. Radio emission existed before Heinrich Hertz, who discovered electromagnetic waves, but everyone remembers in this connection not him but Alexander Popov and Guglielmo Marconi, who invented (but did not discover) a radio transmitter and radio receiver and made it out of coils, relays, antennas and other parts not invented by them. Therefore, everything that is made by human hands and surrounds us was created not by scientists but by inventors, i.e., engineers, since without engineering knowledge and technical details, elements, assemblies and equipment invented by previous generations of creative people it would have been impossible to do this. Science cannot exist without engineering. It is unfeasible to discover volcanism on the Moon without a telescope, just as it was unfeasible to discover the Higgs boson without the Large Hadron Collider – a miracle of modern engineering. Science is not the cause, it is the consequence of engineering progress.

1.1.2. Prerequisites for the Philosophy and Science Formation

I want to draw attention to the fact important for my research. Philosophy and science existed long before the appearance of many advanced engineering technologies. Although the basic technologies, such as fire, tools, weapons, clothing, housing construction and other engineering solutions, were already available. As there was already a language – those who learned to pronounce new sounds as well as give names to objects and phenomena around

them and then transfer this knowledge with the help of sounds to other people, were information technologists, i.e., engineers.

Ancient civilizations, that knew about the movement of stars and planets probably even more than we do, laid the foundations of astronomy and mathematics. Antiquity is already the pinnacle of rhetoric, logic, ethics, aesthetics and natural philosophy. The Middle Ages reached the limits in building various models of metaphysics and theological doctrines. But almost all this time, epoch after epoch, humankind used devices that had little change to them and were quite simple on the 21st century scale, such as a wheel, gear wheel, lever, inclined plane, pulley and screw.

For Antiquity, technology was considered something unworthy. A free human had to be immersed in the world of ideas as a rational being before everything else. Dealing with the world of things was the domain of a slave who is a thing by definition. The engineers, of course, were in good standing. They have achieved great success in the construction of buildings and ships. But on the social ladder, they, along with artists and poets, were located much lower than politicians, philosophers and warriors. The Middle Ages, following these guidelines, generally put everything material and corporeal below the spiritual. In some cases, one can speak of contempt for the material world as an imperfect likeness of what can be comprehended only by prayer and reason.

Neither in Antiquity nor in the Middle Ages there was anything that could be a prerequisite for the formation of natural science. Firstly, it was unacceptable to interfere with the world created by God and to perform certain experiments, considered violence in itself, on it. This could be regarded as an encroachment on the divine world order, as an attempt to change the natural course of things in favor of one's own will, which was equated to witchcraft and could've ended with the Inquisition's bonfire. Secondly, it was believed that human, as the image and likeness of God, contains all the knowledge that can only be available to them. Only the mind, dealing with ideas that precede things, is able to comprehend the essence of these things.

To illustrate what has been said, I will recall an anecdote about two monks. It seems to have been composed in the Middle Ages and describes well the spirit of knowledge of that time. The monks were walking around the garden and saw a lot of holes dug by moles. They began to discuss whether a mole has eyes. The first argument was that an animal spending almost all its time underground does not need eyes. Divine providence does not create anything unnecessary, which means that the mole has no eyes respectively. The second monk objected that since the mole sometimes comes to the surface, it needs eyes and, therefore, they are present. The argument continued in the same vein. Then the gardener approached them and offered to dig up a mole to check which of the hypotheses is correct. In response, he heard: "Go away, ignoramus, you don't understand anything about learned conversations."

For a long time, cognition was mainly speculative in nature. What has changed? And why did engineers start playing more and more prominent roles? Here again we will have to make a reference to Marxism, which is especially important in the following description.

The transition from the feudal formation to capitalism, in which engineering developments began to play a decisive role and in which experimental science was formed, is described through the process of initial capital accumulation. In general terms, the logic is as follows:

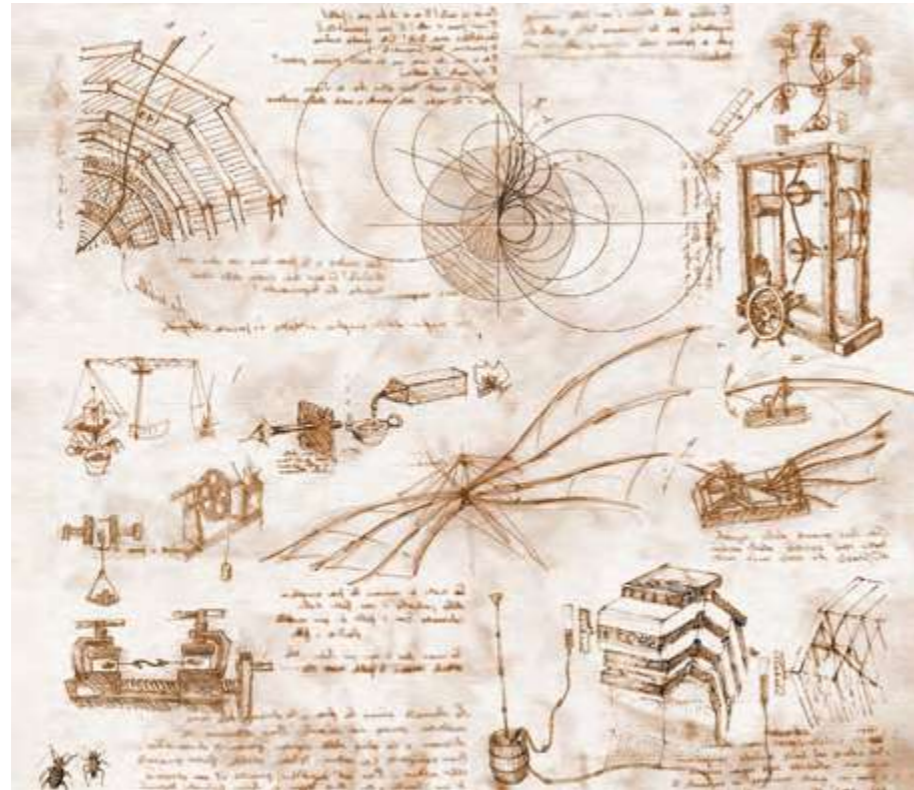
1) people hungry for profit by their own means or with someone's help come up with engineering solutions that allow them to achieve selfish goals more effectively. First of all, they need transport to trade as well as weapons to protect their wealth and take away the wealth of others;

2) engineers gradually create more and more advanced vehicles and weapons. Trade becomes an increasingly reliable and safe way of getting rich. Ships sail farther and farther and sink less and less. Attacks on caravans require more and more technical equipment and are available to fewer and fewer people;

3) wealth, the size of which turns out to be much larger than the fortunes of some kings, is concentrated in the hands of the most successful merchants who inhabit territories on the shores of the Mediterranean Sea, which are the most favorable for their activities. And although the merchants themselves often do not even belong to the nobility, they begin to experience royal ambitions. In particular, this is expressed in the desire to perpetuate oneself in some way;

4) newly rich class promote artists, builders and inventors who create portraits and palaces for them as well as various devices intended for fun, such as musical instruments and other mechanisms. The people serving the first capitalists are forced to look for new and new ways in order for each work to be unique and thereby amuse the customer's ego. At the same time, work is carried out within the framework of material world, not only the spiritual one. Materials are being searched for while properties of substances as well as original techniques in construction, painting, sculpture and mechanics are being discovered. The purpose of everything is purely practical. It is neither to serve the state, as it was in Antiquity, nor to serve the king or the church, as it was in the Middle Ages. Now the goal is to please an ordinary person and, in fact, to make their life as comfortable and safe as possible. At the same time, the achievements of engineers are analyzed and recorded in scientific books.

This is how the Renaissance and the Modern Era began, forming the experimental natural science being the basic of a contemporary one. We can see the decisive contribution of engineers with their role being more significant than before due to an increase in the number of needs, as they remain a class that serves these needs. Despite the fact that due to the engineers' efforts the resources necessary for both the formation and satisfaction of these needs have been released and concentrated, engineering began to be at the service of money more and more, while continuing to be at the service of power started back in the days when the invention of the axe or spear gave one tribe an advantage over another and helped to prevail. Around the same years politics has emerged and it was also thanks to engineers.



1.1.3. Emergence of Politics

Politics, like trade, only to a much greater extent, is connected with the improvement of weapons. The primitive bow and fire followed by gunpowder and projectile – all these inventions have changed and largely predetermined the nature of politics. If it is true that politics is a struggle for power, and war is an extreme form of struggle for power, then tribal warfare in the primitive communal system is the limit of possible political claims of that time. Why were there no great armies and great campaigns? Because the great army needs a large supply of fodder. This means that carts are needed, and they are much more complex devices than stones and sticks. In addition, the bronze or iron sword allows you to kill with one swing, without plunging into a scuffle with improvised objects. The army becomes capable of crushing with lightning speed and moving on, without leaving the enemy's unfinished soldiers behind.

The fleet created by engineers opens up new scales of politics. Now it can spread beyond continents. Empires that unite peoples are being created. Firearms, as they spread, allow politicians to be less afraid of adversity such as peasant uprisings. You just need to prohibit commoners from having guns – and any rebellion becomes relatively easy to suppress. Although in previous centuries, several people armed with pitchforks posed a serious threat even to an armored knight. The more technologically advanced weapons became, the more power it was possible to concentrate in one hand. This direct correlation between the extent of power and the degree of killing devices perfection was probably the root cause for the weapon development always being at the peak of technological progress.

The bow for hunting and war was most likely invented earlier than stringed musical instruments. The axe was before the hammer. Gunpowder, however, is an exception, and it was initially used for fireworks while bombs, cannons and muskets were invented much later. In all other respects, there were almost no exceptions in the rule of military engineering being prioritized over the civil one, since there were politicians who concentrated wealth in their hands and could afford to pay engineers more than anyone else.

The warhead launch vehicle was developed much earlier than the rocket used for conquering space. The atomic bomb preceded atomic energy. The first satellite, the first computer, the first robot – all this was created by order of the military always serving politicians. And engineers, whose efforts have built the foundations of the most powerful states, also turn out to be service personnel. At the same time, they often become accomplices of the most terrible crimes directed not only against people but nature as well. However, good deeds also happen thanks to the intellect and the hands of engineers. By creating prerequisites and tools for the development of sciences, making possible and determining the content of art, they give humanity numerous reasons to hope for the best.

1.1.4. Origin and Development of Art

The art of music is impossible without musical instruments created by engineers, while painting is not able to do without paints and brushes – they are quite engineering developments as well. As for the literature, at some point in its development it became necessary to create parchment, papyrus, paper and later a printing press. In turn, a theater is not only a building but also various mechanisms, lighting and much more. Already in Antiquity, Heron of Alexandria prepared an essay called “Automatic Theater”, in which he described complex structures that, due to the use of gravity, allowed changing the scenery automatically. Everything happened according to a preplanned scenario, in strict sequence, considering time intervals. The machine worked like a clock or even like a program implemented not on punched cards but on rolls with spikes and ropes wound on them. This is how the engineer solved the problem associated with the creation of the show. Finally, there’s cinema that is a complex synthesis of various high-tech engineering solutions. However, more importantly, as in the case of religion, art is defined by engineering not only technically but also in terms of content and existentialism.

You can refer to the etymology of the word “art” itself. It has a common root with “artificial”. Something that is not natural. It is human-made. It is already implied here that an artist needs tools.

The primitive authors, who painted hunting scenes on the walls of the cave, had a fire in this cave to provide light. They invented or borrowed a way of drawing lines and strokes. They found the necessary materials. In the end, they survived, reached adulthood and were able to feed themselves – also thanks to engineering devices. Moreover, and more importantly, their chosen theme reflected the goal and the pinnacle of engineering excellence of those times. Spears, stones, traps, rituals using musical instruments – all this is a world created by engineers and made possible thanks to them. They formed the perception and the plot for the artist to illustrate. Similarly, abstract art of the 19th–20th centuries is associated with the appearance of a train and a car, which set a different speed of movement and then the nature of perception of reality, blurring the faces and outlines of objects, breaking them into fragments.

The technogenic world is not just the world of science, technology and engineering, which is not a bad thing in itself, but also the world of the material: material production and consumption, material relations and contacts. The entire strength of modern civilization – agriculture, industry, transport, energy, electronics, computers, smartphones, the internet, cities, roads, etc. – is created by engineers.

Before engineers understand how to save the planet, the biosphere and our technogenic civilization, it is worth looking back and tracing the entire history of the Earth’s civilization from an engineering point of view. It is also useful to look at the relationships between two global ecosystems: the biosphere, shaped over billions of years of evolution by Live Nature, and the technosphere being created by *Homo sapiens*, or more precisely, *Homo technocraticus* [1].

1.2. Engineering Chronology

1.2.1. Engineering Epoch Technosphere 1.1

(approximately 2 mln years B.C. – 5,000 years B.C.)

Engineering thought originated at the primitive stages of social evolution, long before the appearance of civilizations. This inevitable necessity with concrete pragmatic results in the form of the first

primitive inventions marked the beginning of an endless technogenic path. At the heart of human activity is the primary experience of interaction with the outside world. Accumulating within the boundaries of one human life or entire generations, this experience inevitably turns into a new quality. Skills are being developed, the notion of previously unseen patterns emerges, rules are being drawn up, and new opportunities are opening up as well. At the same time, new needs arise and various sociocultural models are being formed.

At a higher stage of cognitive ability, with the accumulation of practical and abstract experience, the world gradually becomes more complicated. The earliest religious and ceremonial practices in the worship of elements or the veneration of ancestors were already distinguished by the qualities of a structured activity organized according to certain rules. Thinking strives to realize its creative potential thus resulting in the emerging of arts. Moreover, the experience of interacting with physical matter (water, air or stone) in any practical activity is so deep that its roots go back to unconscious times. Such an experience was accumulating in us even in the epochs preceding the state of savagery, at the beginning of the path of that beings who one day realized themselves as humans.

A person began to divide practical activity into the construction and arrangement of a dwelling, the invention of hunting tools and cultivation of the land, the creation of places of worship for the service of cults – this is how crafts were formed. At the stage of the tribal society decay and satisfaction of primary needs, they were already an integral part of life. The advantages that crafts gave along with new knowledge and arts were steadily changing the world.

In history, we observed an ever-increasing pace of development, mutual influence and interweaving of various kinds of human activity and ideas. There came a time when engineering became something of a luxury and intellectual game for elites. Archimedes in the 3rd century B.C. came close to the origins of mathematical analysis, laid the foundations of hydrostatics and designed such effective mechanisms that thereby delayed the capture of Syracuse

by the Romans for several years. The image of an ancient Greek philosopher-mechanic, bent over drawings despite the risk to his life, was inspiring subsequent generations of engineers and researchers. Did Archimedes need a royal crown? If so, then only in order to come up with a universal method for assessing the purity of the gold alloy from which it was made.

The vast world of natural science with a variety of thinking and theoretical approaches in its study was attractive in itself so much that often the conclusions obtained could not be consistent with reality. And as they said in such cases, resting on another paradox, dualism or denial in general: “So much the worse for reality!” In fact, the work continued, and science found physical confirmation of what previously existed only as a result of private speculations.

The technological vector of human development, which in the 21st century turned into an industrial one, was chosen about 2 mln years ago by our distant ancestor – primitive human. It started when not yet quite a human but no longer a monkey invented the first engineering technologies – lit a fire, began to fry meat on it, processed animal skins and made the first primitive tools [2]. Furthermore, people have domesticated the wolf, which allowed them to improve efficiency of the hunts and won in the interspecies battle. Later on, our ancestors, the Cro-Magnons, due to their inherent anatomical features (one might say, a physiological “defect”) that were insignificant at first glance, namely the structure and location of the vocal cords, made a fundamental evolutionary leap by inventing speech. It enabled the possibility to accumulate and transmit oral knowledge from one person to the others. This became the most important social invention without which further development of engineering technologies would not have become possible.

It can be identified as the first technological development level for different tribes (clans), when the concept of “humanity” had not existed as of yet. This period lasted for about 2 mln years. That is, until the ancient engineers invented the wheel, saddled the horse and hitched it up to the first wagon (about 5000 B.C.). The communication of ancient human, like any other animal, in the first epoch was limited only by the natural parameters: muscular strength

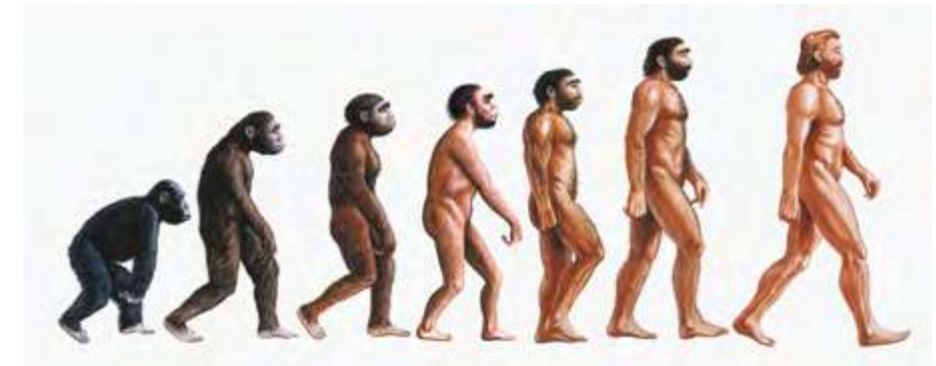
(running and walking as a material and energy component), vision, voice and hearing (an informational component).

It was the first (perhaps even zero, at the level of the ground) floor of the endless technological staircase of the infinitely high building named engineering knowledge, having its floors that are technological (more precisely, engineering) epochs. However, even then scattered tribal civilizations had experienced their first local (house-based) ecological crises. People burned bonfires and processed skins in the caves, i.e., their homes, thus dying of lung cancer at the age of 20 from the unbearable smog and carcinogens contained in technological wastes. Although the capacity of “technological equipment” – the fire – was low, about 10 kW, and the technological fuel – firewood – was quite safe and harmless.

Nevertheless, they survived by taking their first technologies outside of their own homes, caves, to the surrounding environment. This technological solution required the creation of additional transport communications – footpaths. The volume of movement then was small, the distance – short: a person physically cannot carry a heavy load far. However, there was no special need for this, as primitive “production facilities” were located near the caves.

Tribes appeared as the first technogenic communities. Gradually, they had initiated formations of nations, which were united by the common interests formed around the ancient technologies. This fundamentally distinguishes us, people, for example, from the dolphin civilization mentioned above, which developed parallel to human but did not use any engineering solutions in their evolution.

The invention of the spear about 500,000 years ago [3] along with creation of the bows and arrows in the 12th millennium B.C. (the main type of weapon up to the 17th century) played a crucial role in the lives of our ancestors. With these weapons hunters got a possibility to kill animals and birds at a distance of up to 150 m. The bow and the arrows were the first complex composite hunting tool which has resulted from a whole epoch of human thinking as well as observation, centuries of experience, considerable mental abilities and knowledge of other ancient inventions, such as spears, spring traps, throwing sticks and traps.



Ancient people began to use hunting weapons in another capacity that was already social: people chose war as a way to release their aggressiveness in the battles for the territories, food sources, resources and partners. This is how one of the first professions appeared – it was a warrior capable of only one skill: to effectively kill others, i.e., their own kind, with the help of special murderous weapons (chopping, stabbing, striking, etc.) invented by primitive engineers.

The life energy used by our ancestors in this epoch was solar energy, which was transmitted along the food chain from phytoplankton and green plants to animals and humans. The technological energy consumed by ancient people (firewood, for instance) was also solar energy.

The world population has reached 10 mln people by 5000 B.C.

The essence of *Homo sapiens*, when interacting with the surrounding world, became two-component in those days: the first component is its biological basis, numbering about 4 bln years of evolution of living matter on planet Earth, the second is technological (i.e., technogenic) feature manifested in the engineering activity of their intelligence. The root of all modern global problems is precisely in the second component of the intelligent person. Therefore, this problem will be further prioritized in this work.

1.2.2. Engineering Epoch Technosphere 1.2

(5,000 years B.C. – the last quarter of the 18th century)

The epoch Technosphere 1.2 had absorbed all the achievements of the bronze, iron and ancient eras of human history as well as the Middle Ages. During this period, a large number of discoveries were made followed by the breakthrough inventions and creation of innovative industry technologies such as:

- ore mining and the inception of nonferrous and ferrous metallurgy;
- blacksmithing and the first manufactories;
- harrow, plow and agriculture;

- wheel, bridle, yoke, saddle and other harnesses, cart and horse-drawn transport with a horse capable of developing a power of about 5 kW, which is an order of magnitude higher than human energy capabilities;

- first glasses, microscopes and telescopes;

- lever, nail, rivet, brick, gear, bolt, nut and on their basis – a variety of complex mechanisms, machines, structures and tools, including those for scientific research.

It was during the epoch Technosphere 1.2, when mathematics, philosophy, physics, the sciences of the microworld and stellar world as well as the sailing fleet appeared. The first geographical discoveries were made, thanks to which people have begun to realize themselves as humanity and civilization living in a resource-limited and confined planet Earth.

Humans continued to improve the existing weapons to create new ones to kill other humans, including clubs, maces, swords, throwing mechanisms, axes, sabres, daggers, rapiers, dirks and other blade weapons. Moreover, they invented gunpowder and firearms (small arms, artillery and grenade launchers) as well as the simplest powder rockets.

When the first states were formed, people created the army. The wars covered more and more areas and became more and more protracted and bloody – the duration of some civil strife exceeded 100 years [4]. The loss of human life from the technocratic vector of development began to grow in proportion to this development, even when a person had not yet coined a term such as “ecology”.

The invention of painting, pictography, cuneiform writing, calendar, papyrus, manuscript, paper and printing made it possible to create, accumulate and transmit knowledge recorded on a physical medium without the need for direct human-to-human contact, which later played a key role in the inception and development of engineering technologies and the entire Earth’s industry.

The development of the pack and wheeled transport on land as well as sailing vessels on rivers, seas and canals had led to the formation of the first road network. Looking back by 2,000 years ago,

a developed network of communications was created in Europe and Asia, including transcontinental connections such as the Great Silk Road, the Royal Road between Egypt and Persia, communications between Egypt, Anatolia and Mesopotamia, the Amber Road between the Mediterranean Sea and Baltic States, the Lapis Lazuli and Jade Roads as well as the Tin Road between the Cornwall Peninsula in Great Britain and the Mediterranean.

The Sumerians, who invented the wheel, and then the Assyrians founded relatively long road network (it already happened about 3,000 years ago!), for the construction of which special engineering troops were formed within the army along with developing reference guides and road signs for its functioning. A network of horse-drawn roads began to form all over the world, and ancient cities immediately began to develop along them.

Hundreds of thousands of kilometers of carriage roads, mostly unpaved, were built on the planet. Transportation volume reached millions of tons per year with the travelling distance of hundreds or even thousands of kilometers. However, the average travel speed, including the rest stops, remained extremely low – less than the speed of a pedestrian, so the long journeys used to take days, weeks and even months.

The size of the spontaneously emerging cities was determined by a single infrastructure criterion – transport accessibility [5]. Back then people understood that the comfortable travelling distance should be limited by half an hour and should not depend on the weather conditions. In the ancient cities, the main transportation mode was the walks, thus the sizes of settlements were limited to a few kilometers, as can be observed in Ancient Rome, Athens or Jerusalem. During the Middle Ages, people were using horses and carriages, which increased the travelling speed and enabled them to cover 10 km in 30 min. Consequently, the size of cities reached similar figures, like it can be seen in Paris, Moscow or London.

The technological energy used in this period was only solar: from firewood and charcoal to horses (via feed) and sailboats (via wind).

By the end of the epoch, the world's population reached a figure close to 1 bln people.





1.2.3. Engineering Epoch Technosphere 1.3

(the last quarter of the 18th century – the beginning of the 20th century)

Main achievements of the epoch Technosphere 1.3:

- technological revolution in the textile industry (spinning machines);
- channels construction, the invention of the water engines and later the steam engines;
- appearance of the steam locomotives and the mass integration of railways;
- steamship construction;
- rapid development of the coal industry and ferrous metallurgy;
- invention of the telegraph;
- introduction of the first vehicles with steam or internal combustion engines, the first power plants and the first electric transport – trams and electric cars;
- creation of building composites and initiating the use of reinforced concrete and asphalt globally;
- discovery of radio waves and creation of radio;
- emergence of the automobile industry and the beginning of large-scale construction of paved roads;
- invention of the first tractor and the beginning of mechanization of the agricultural industry;
- first flight by plane and the creation of aviation;
- rapid development of popular sciences (mathematics, physics, mechanics, chemistry, philosophy, biology, etc.);
- explosive growth of industry and cities, the creation of industry and industrial countries, which is still an ongoing process.

Extraction of raw materials for construction, industry and transport had exceeded 1 bln tons per year, including stones, clay, sand, ore, coal, oil, etc.

The world's population reached 2 bln people.

The road network began to expand and there were qualitative changes in logistics infrastructure: the length of railways and gravel

roads exceeded 10 mln km; the average speed of movement on the railway also increased and significantly exceeded the speed of pedestrians.

The capacity of thermal engines using fossil fuels began to grow and reached thousands of kilowatts for steam locomotives and tens of thousands for steamboats (for example, for Titanic it was 55,000 HP). The annual production of such machines, including cars, began to grow rapidly and exceeded the value of 1 mln units.

The industry and its servicing cities began to develop rapidly along the railways. Traffic volumes had drastically increased to more than 1 bln ton per year. The scale of construction, even using simple tools like mattock and shovel, was set at a high rate even for modern standards. For example, while Russia had been analyzing the need of the Trans-Siberian Railway going from Saint Petersburg through Moscow to Vladivostok (the Ministry of Transport offered an alternative project: to develop horse-drawn transport in the central part of Russia), in the United States, more than 20 similarly scaled railways were built over 15 years (from 1880 to 1895), with the combined length of 187,000 km. It created a sustainable foundation for the most powerful economy in the world [6].

More and more fertile lands were allocated for the transport infrastructure and industrial facilities. These lands were withdrawn from the biospheric processes. Subsequently, they were not used to grow green plants and did not produce oxygen, necessary for the living creatures. At the same time, the volume of industrial waste released into the biosphere had increased. This resulted in problems of regional ecology caused by industry and transport, from deforestation in adjacent territories to landfills and smog in industrial cities. Multinational corporations and rich people emerged, able to concentrate huge resources in their hands to make a profit from engineering technologies, including socio-economic and military-political ones. This had become the main criterion for the development of both individual enterprises and organizations as well as most countries.

The technological energy used in this era was only solar: from firewood, coal and oil (nonrenewable sources) to windmills and hydro-power plants (renewable sources).

1.2.4. Engineering Epoch Technosphere 1.4

(the beginning of the 20th century – the third quarter of the 20th century)

The epoch Technosphere 1.4 was based on the following:

- production and rolling of steel alloys;
- development of heavy engineering industry;
- construction of giant hydro-, thermal- and nuclear power plants, transnational transmission of power;
- industrial development of inorganic chemistry products and the beginning of agricultural chemicalization;
- mass development of the automotive industry;
- development of aviation and aircraft industry.

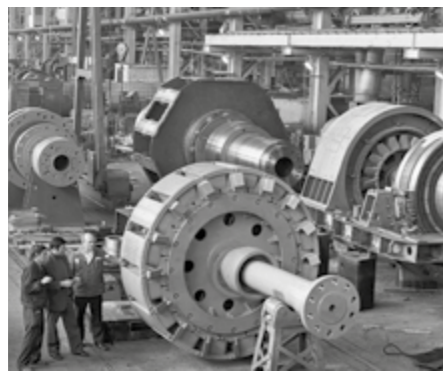
Atomic and hydrogen bombs were invented as well as powerful multistage launch vehicles for them based on solid or liquid fuels. The rocket and space industry began to develop rapidly, both for military and peaceful purposes.

The following breakthrough technologies were implemented:

- the first artificial satellite of Earth, after which a person for the first time went to near space and, later, was able to visit the Moon;
- television and electronics.

Further development and improvement took place in the internal combustion engine and vehicles, aviation and shipbuilding industries, the formation of nonferrous metallurgy, production of synthetic materials and composites, organic chemistry products, oil production and refining.

Large-scale construction of highways had begun. As a result, the production of new vehicles with an internal combustion engine had increased dramatically: automobiles (cars and trucks with the production by tens of millions a year), ships (including hovercraft and hydrofoils), aircrafts, airfoil boats, surface-effect airborne ships as well as launch vehicles.



Access to the personal vehicles and highways had initiated creation of the American-like one-storey suburbs supported by the mortgage services, and it initiated the possibility to live dozens of kilometers away from the city, where the work is located. Simultaneously, the average speed increased to the values 5–7 times higher than the pedestrians' travel speed. The car has become the dominant mode of transport, because, unlike the railway, it is able to provide transportation service "door-to-door" and can be purchased by any family or by a wealthy person.

The rapid development of all sectors of the industry – from agriculture and household chemicals to electronics and automobiles – had occurred with a single goal: to make a profit by satisfying the ever-increasing and specially cultivated consumption of technogenic products and services (including food) by a new kind of technocratic human – the person who consumes.

The fast growth of a new type of technogenic employers, like transnational corporations and oligarchs, working exclusively for profit, has led to the formation of new goals and objectives for them: limiting the growth of the Earth's civilization, including by eliminating "extra mouths". This is how the "golden billion" theory emerged. We'll speak about it later.

The rapid expansion of cities and megacities has increased the world's population to 5 bln people.

The development of technology and transport – rail, automobile and aviation – has created a powerful military industry in many countries. Two world wars were unleashed, the bloodiest in the history of humankind, as a result of which not only at the front but also in the rear about 200 mln people were killed. This became a visible manifestation of the antihuman actions of the finally formed so-called "deep power".

Technological progress began to cause more and more tangible damage to the technogenic civilization that had given rise to it.

The power of machines and equipment using fuel, the combustion products of which were released into the environment (mainly into the atmosphere), reached the following values: tens

of thousands of kilowatts for aircrafts, millions for power plants, over 100 mln kW for heavy launch vehicles.

The technological energy used in this era was mainly solar: from coal and oil to hydro, wind and solar power plants. However, a new source of energy has also appeared – nuclear fuel, i.e., stellar energy, since all heavy chemical elements (carbon, oxygen, etc.), including radioactive uranium, could only be formed during the explosion of supernovae – this is the fate of the evolution of many luminaries in our Universe. That is why our planet and we, humans, are made up of “stardust”.

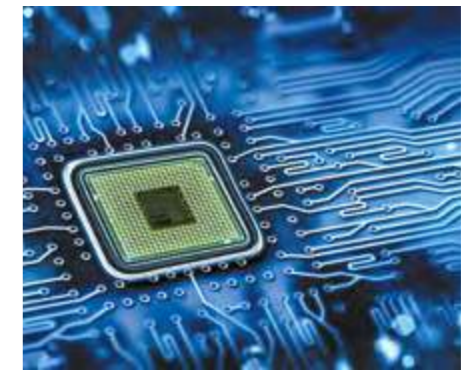
1.2.5. Engineering Epoch Technosphere 1.5

(the third quarter of the 20th century – the first quarter of the 21st century)

I will list only achievements of the epoch Technosphere 1.5, such as:

- rapid development of the electronic industry;
- creation of microchips, microelectronic components and personal computers;
- emergence and large-scale spread of the internet and wireless communications;
- intensive development of fiber-optic communications and telecommunications;
- development of complex computer software;
- widespread use of robotics;
- large-scale production and processing of natural gas;
- comprehensive provision of informational services;
- emergence of 3D printing and artificial intelligence.

Next, it is proposed to understand the nature and possibilities of the engineering phenomenon and then to return to the journey through time and, based on it and today’s realities, to try to predict the possible options for the Earth’s human civilization for the future.



2. STATE OF AFFAIRS IN THE FIRST QUARTER OF THE 21st CENTURY

2.1. Status of the World Created but Not Controlled by Engineers

So, almost everything that constitutes the basis of our civilization was created by engineers. However, this world is governed by others – those who prioritize personal enrichment; those who naively believe that in a situation when Earth is on the verge of destruction, money will save them. These people are sure that together with their families they will be able to take refuge on private islands, in underground bunkers, on submarines and Boeings with missile defense. But they are wrong. The planet's biosphere is one big room, devoid of even partitions; there is nowhere to hide.

The number of people living on Earth has exceeded 8 bln. Urbanization is accelerating, urban agglomerations are merging into megacities with a population of more than 10 mln inhabitants. By the time of writing this text, there are 33 such megacities on the planet, including six cities with populations of more than 20 mln. The urban population began to prevail over the rural one and exceeded the 50 % mark in 2007. The present time is marked by the emergence of a new kind of techno-consumer, namely the “humans of asphalt and smartphone”, who have atrophied their connection with the Live Nature that gave birth to them and raised them.

The construction of highways is progressing rapidly, the network of high-speed railroads is developing – the total length of all roads in the world, including the unpaved ones, is about 65 mln km [7] (of which more than 35 mln are paved). Planet's soils turned out to be

“rolled up” in asphalt and “buried” under sleepers. Their total area exceeded the territory of Great Britain by five times. The soils adjacent to the roads, which occupy the territory 10 times greater, are degraded. They are polluted with products of fuel combustion, tire and asphalt wear, deicing salts containing more than 100 carcinogens, as well as waste associated with related industries – oil refineries, chemical and asphalt-concrete plants, graveyards of old cars and car tires and much more. Just their enumeration would take several pages of text.

Traffic jams of many hours and many kilometers appeared on the roads. As a consequence, the average speed of traffic in megacities dropped sharply (to the speed of a pedestrian) followed by air pollution and smog, consisting of a mixture of exhaust gases, tire and asphalt wear products as well as industrial gaseous and dusty waste. The quality of life in cities began to decline sharply, including due to the deterioration of transportation accessibility. Travel to and from work in many cities of the world started taking up the bulk of free time – up to 3–5 h daily. In some cities, it has become unsafe to go out without a mask (even before the coronavirus pandemic).

Engineering technologies have declared war on the technogenic civilization that uses them unwisely. And neither the technologies themselves nor the engineers who created them are to blame. Transportation in this invisible conflict is the most dangerous invention in the entire history of technological development. On the world's highways alone, approximately 1.5 mln people are currently killed each year (some of them die in hospitals from postaccident injuries and therefore are not included in conventional statistics), and more than 10 mln become injured, disabled and crippled. This is just the direct obvious damage that lies on the surface. The number of people dying every year in nonstop local wars on the planet as well as from technogenic disasters and terrorists' activities is several times fewer. If the third world war happens, with its use of nuclear weapons, which can bring incalculable misfortunes and losses to humankind, transportation will also be to blame for the huge number of victims. Nuclear warheads will be delivered and dropped on peaceful cities by transportation means (missiles, planes, ships and submarines) invented by engineers.



The 21st century is distinguished by an increasing use of mineral fertilizers and toxic chemicals in agriculture, which leads to a catastrophic deterioration of the biogeocenosis of soils and food grown on them. In its biological essence, food is not so much a source of energy, but rather a building material for cells, organs and the body as a whole. Our cells live on average for about half a year, then die and are excreted from the body, and new ones appear in their place. At the same time, such a building material must contain more than 80 chemical elements in the form of a huge variety of organic compounds taken by plants from the living and fertile humus of soils. However, the degraded soil cannot give what it does not contain. That is why humankind began to increasingly use sort of biological “crutches”, namely genetically modified products and dietary supplements (biologically active additives). In fact, in order to make an easy profit the food genocide of humankind has begun, as it allows for making huge amounts of money on it.

A powerful upsurge in pharmacology has taken place. You do not need healthy people to make a profit, since you can earn more on a chronically ill patient. Gene technologies began to develop rapidly. A human started to “improve” living organisms like an engineer. At the same time, due to their limited intelligence and knowledge, people are not only unable to understand the designs of what they are “improving” but also unable to foresee the distant results of such activities and the harm that may be caused to humankind in the future (as an example, the spread of coronavirus; and in the context of the above, it does not matter whether it is of natural or artificial origin).

The ideology of the planet’s carrying capacity, which has already been allegedly exceeded, is being formed. Civilizational values are being revised and shifted to maximize the consumption of new and excessive material goods (new house, new car, new computer, new smartphone, new clothes, new shoes, etc.) as well as new services: transport (constant increase in the length of roads and the distance of travel by personal transport), energy (construction of an increasing number of thermal power plants, including the nuclear ones)

and information (internet, mobile communications, television, mass digitalization).

Transition of consumers from material to virtual digital reality is being cultivated everywhere, as it is easier to earn higher profits there. In addition, the cult of emotional marketing is being created, which turned the vector of excessive consumption into the informational component: the market began to sell emotions rather than the goods themselves. This approach has sharply reduced the quality of goods. Why make a reliable and durable car or smartphone if in a year or two the consumer will buy a new one? Why reconstruct an old building if it is easier to demolish it and build a new one, and of lower quality? This has proportionally increased the resource intensity of all industries and raised the technogenic pressure on the biosphere.

The pervasive digitalization of society exacerbates the global problems of humanity, since any digitalization relies on the material component of the technosphere. In particular, the power of two power plants similar to Chernobyl Nuclear Power Plant is already being spent to support the global Bitcoin network [8].

More than 5,000 satellites have been launched into Earth's orbit to provide the internet and mobile communications. Elon Musk plans to put more than 40,000 satellites into orbit, which will require about 700 starts of the Falcon 9 heavy launch vehicle with 60 minisatellites on board [9]. But this will cause enormous damage to the Earth's biosphere and the planet's ozone layer.

The era is declaratively proclaimed as the century of saving resources (energy, raw materials, mineral, spatial, financial, labor, time, food, etc.) without a systematic understanding of the main thing: what, why, what for and how to save. Thus, over the century, the world population has grown by six times while the GDP – by 20 times, which has produced a multifold increase in the demand for some resources [10].

At the same time, humanity has entered an era of expensive resources – the era of low prices is a thing of the past. The expansion of the planet's middle class by 3 bln people within 20 years will increase the demand for new resources, and the search for other

sources of minerals, energy, food and water will be complicated and too costly.

Shortages or price increases for one type of resources will spill over to others. An attempt to meet the progressive demand by means of proportional growth of production will require investments in the world economy of more than 10 tln USD annually [11]. This may become another springboard to the point of no return for the Earth's technogenic civilization.

Meanwhile, services, among which transport and logistics are the main ones, are not considered as the basic consumer resource. However, our civilization will not be able to exist without them. Few people carry out optimization of these services, which are the most environmentally dangerous, costly and resource-intensive.

Roads and infrastructure, power plants and power transmission lines, communication satellites and the internet are created to provide humankind with qualitatively new communications, i.e., transportation, energy and information services. In engineering theory, these services can be much more efficient, accessible, economical, environmentally friendly and less costly (less resource-intensive) as well as be aimed at maximizing the savings of the most valuable and nonrenewable humans' resource that is time. In practice, they do not fulfill this role and everything happens vice versa.

The technological energy used in the 21st century is mainly solar (coal, oil, hydro, wind and solar power plants, etc.) and stellar (nuclear fuel). Engineers have a dream: to use the energy of singularity, i.e., the energy of thermonuclear fusion (its fuel, namely light chemical elements, including hydrogen, has formed about 14 bln years ago at the Big Bang [12]). However, there are no examples of solutions using this type of energy, although tens of billions of dollars have already been invested in the development of this technology since the 1950s.

This dream, for which humankind has spent 70 years (for example, the same amount of time the USSR existed) and tens of billions of dollars, is futile from the engineering point of view, since it has already been realized in a natural thermonuclear reactor – the Sun. Unlike Chernobyl and Fukushima, not a single accident has occurred

in the Sun for 5 bln years of “operation”; there will be no accidents in the next 5 bln years either [13]. It is much easier to convert fusion energy obtained on the Sun into electricity than that produced in a tokamak (a human-made fusion reactor), therefore, people have been using solar power plants for a long time, but whether tokamaks will ever work is a big question.

Looking back at the entire engineering path traveled, one can see: the development of humankind was carried out in spurts. Generally speaking, there are only two significant shifts. The first one is the Neolithic Revolution (domestication of animals, fire extraction, invention of tools as well as the simplest mechanisms and devices – wheel, axle, wedge, lever, inclined plane, screw and block). In a short time, a colossal breakthrough of civilization was provided, and then we’ve been developing not intensively (qualitatively) but extensively (quantitatively) for a long time.

The second revolution, in general terms, is associated with the discovery of the scientific method and scientific approach in engineering. This stage provided an even sharper and more radical shift, but it also appears to have its limits of qualitative transformation. We could continue to develop quantitatively, but the forces awakened during the second leap, primarily industrial ones, do not allow us to hope for this. If the same approaches are maintained, our technogenic civilization will perish rather quickly – in agony and convulsions.

Staying in place in the civilizational sense is hardly a feasible task, although this is seriously thought about and seriously talked about. The concept of zero growth, zero environmental impact and the like are proposed. However, there is a contradiction of these programs that is universally and philosophically understandable and accepted by us: what does not grow, dies.

In the 21st century, the last point may be set for our human civilization in the experiment that has been lasting on Earth for thousands of years, similar to one in a Petri dish, only not in a local but in a planetary ecosystem. In a short time, having eaten limited resources and polluted the entire space with the wastes of its vital activity, the mold inevitably dies. The main reason is that there are no circulations of substances, energy and information in the cup, and there

are no trophic (food) chains, when one species of living organisms feeds on other species and their wastes. As a result of similar processes that have been going on continuously on the planet for billions of years of evolution, the main biospheric wastes – soil humus and atmospheric oxygen – are formed. A dead Petri dish returns to its original dead state according to the second law of thermodynamics – the increase in entropy of any enclosed system.

2.2. Social Engineering and Pseudo-Problem of Global Overpopulation

The critical state of the environment and limited amount of resources force government and business to direct engineers towards the development and mass implementation of systems that serve the interests of only a limited number of people. A future in which more than 7 bln people may be genocided, is being built by the hands of engineers. New achievements are designed to retard development, weaken health, reduce fertility, etc. Not directly but indirectly, engineers use their knowledge and skills to create instruments of mass murder. In fact, they find themselves in the situation of those specialists who designed crematoria and gas chambers in concentration camps. The motives dictated and imposed from above are also very similar. It is again about the struggle for living space.

There are almost no places left on Earth where humans have not set foot on. The planet’s population is constantly increasing, while the populations and diversity of other species of living beings are, on the contrary, decreasing. Scientists claim that the growing consumption of resources is exhausting the capacity of the natural environment. Some assert that in the near future this will cause irreversible consequences – environmental catastrophes, wars, famine and possibly the complete extinction of humans as a species. But is this really the case? Have we reached the limits of possible growth? Or is someone trying to convince us that we have? What is the problem of overpopulation? What is the history of its study? And what is behind it?

In 1798, the Englishman Thomas Malthus anonymously published a small book "An Essay on the Principle of Population". The priestly scientist was interested in two questions:

- 1) what causes are holding back humanity's development and increasing its prosperity;
- 2) how these causes can be eliminated.

Malthus' answer strikes his contemporaries with its simplicity and cynicism. The reason lies in the constant desire of all living creatures to multiply faster than the amount of food at their disposal allows them to do so [14]. In the absence of war and disease, humanity reproduces too quickly. Its number grows exponentially, while the increase in agricultural productivity can only occur in arithmetic progression. When the number of people exceeds the land's ability to feed them, there are riots, wars and other upheavals. It is this circumstance that hinders the development of society and the improvement of people's lives.

No matter how much food people produce, there will always be even more eaters. Moral abstinence could remedy this, but the common people, who constitute the majority, are incapable of this. It follows that a prudent ruler who wants peace and tranquility for his citizens should keep them in a state of semi-starvation by not giving more than is necessary to sustain life. Mercy for the poor will only lead to an increase in their number. The task is not to find a way to feed the surplus population but to reduce its number as much as possible by one means or another.

A classic example used by the proponents of Thomas Malthus' doctrine to prove his point is the Irish famine. In 1844, more than a third of the country's potato fields were infested with parasites. The harvest was enough to survive the winter, but the next year the situation worsened. The Irish had to plant sick or poor-quality tubers. The new crop was even worse than the previous one. Farmers couldn't afford to pay their workers. Landowners found it more profitable to graze cattle on their Irish land than to lease it to peasants who were unable to pay under the circumstances. More than 2 mln peasant tenants were forced off these lands, left without a source of livelihood.

People went to the cities, but there they faced other problems. The government tried to provide at least some income by hiring the most enduring people for construction work. However, the winter of 1846–1847 was unusually cold, and outdoor labor became impossible [15]. The money allocated to help the poor was exhausted within two years of misery. Epidemics began. People were mowed down by typhus, dysentery, scurvy. More than a million died of hunger and disease. An equal number emigrated to Canada and the United States on old dingy ships, which were nicknamed "floating coffins". In overcrowding, without medicine or enough food, only 8 out of 10 of those who traveled 5,000 km across the ocean made it to the New World. In total, the population of Ireland halved from 8 mln to 4 mln. Thomas Malthus' admirers cited overpopulation as the main reason for this, which allegedly led to the fact that crop failure turned into famine.

The teachings of Thomas Malthus have had a tangible impact on economic science and world politics. It has even been argued that Darwin's theory may have been inspired by these ideas. At least, the essence of today's commonly accepted view of the evolution of nature coincides with what Malthus said about the development of society: "There is not enough for everyone!" Therefore, conflict is the most global and profound phenomenon, the true driving force of life in all its manifestations.

In relation to society, such a concept is represented in Social Darwinism. Struggle, natural selection and survival of the most adaptable organisms are the main concepts of doctrines of this kind. In modern history, under the influence of Malthusianism and Social Darwinism, Hitler's idea of "living space" was formed. It became one of the main triggers of the conquest policy of the Third Reich.

Whereas in Germany in 1871 there were 56 inhabitants per 1 km², in 1910 – 120. Before World War I, the country was constantly deficient in agricultural production: 28 % protein deficiency, about 20 % calorie deficiency; food supply crises also continued in the 1930s, turning into a real nightmare for Hitler.

"The annual increase of population in Germany amounts to almost 900,000 souls, – wrote the German Führer on the pages

of "Mein Kampf". – The difficulties of providing for this army of new citizens must grow from year to year and must finally lead to a catastrophe, unless ways and means are found which will forestall the danger of misery and hunger... Therefore, the problem was: a policy of territorial expansion or a colonial and commercial policy... The sounder alternative, however, was undoubtedly the first. The principle of acquiring new territory, on which the surplus population could be settled, has many advantages to recommend it, especially if we take the future as well as the present into account" [16].

Hannah Arendt, the founder of the theory of totalitarianism, believed that Hitler's racist ideology was directly derived from Darwinism, which in turn was linked to the ideas of Malthus. Indeed, if the essence of all social and historical processes consists in the struggle between their participants for limited means of existence, then sooner or later one of the parties, represented by nation, class, race or any other group of people, will proclaim itself the chosen one, for some reason inherently superior to the other and therefore worthier for survival. It is Darwinism, by virtue of its apparent neutrality, which is obligatory for science, that legitimizes the old, universally understood doctrine of "power is right".

Thus, the following has been scientifically substantiated:

1) in foreign policy – the right to seize resources and territories from other nations;

2) in domestic policy – the right to seize property and land from disfavored members of society: class, ethnic or religious groups.

Subsequently, complex ideological concepts, replicated by propaganda, were adapted to society's demand for the redistribution of a limited number of benefits. They became so deeply rooted in the consciousness of people that some Jews, for example, were willing to accept their racial inferiority and death as something necessary for the good of society. They obediently lined up to the gas chambers and machine guns, even though they could not help but guess, and sometimes even knew exactly what awaited them. History has shown the horror of such beliefs and at the same time has disproved them.



Hitler's fears of famine awaiting overpopulated Germany, which cost the lives of tens of millions of people, turned out to be futile. In the 1950s–1960s, the so-called Green Revolution [17] took place in Europe. It was associated with the development of more effective plant varieties and their introduction into production, the expansion of irrigation, the application of fertilizers and pesticides as well as the use of modern technology. After that, 4–5 % of German farmers was enough to meet more than 70 % of the country's food needs, and their share in the gross national product was negligible compared to prewar times. On the other hand, the second half of the 20th century is a period of a sharp increase in inequality between poor agrarian and rich industrialized countries. Against this background, the doctrine of Thomas Malthus not only did not disappear from the intellectual horizon but, on the contrary, found a second life in the form of neo-Malthusianism.

Neo-Malthusianism refers to the promotion of birth control measures taken by many modern states. It also includes mass introduction of contraception and legalization of abortion, promoted by various public organizations around the world since the beginning of the 20th century. An important role in this work was played by representatives of the women's rights movement in Europe, the USA and Japan. Among the most famous neo-Malthusians are Michael Postan and Carlo Cipolla. They believe that social and economic conflicts are a consequence of demographic overload. The concept of overpopulation of the planet is emerging.

In 1972, at the request of the Club of Rome, which unites representatives of the world financial, political, cultural and scientific elites, specialists of the Massachusetts Institute of Technology prepared the famous study "Limits to Growth" [18]. The purpose was to determine the possible limits of economic and demographic growth of civilization due to the fact that the natural resources of the planet are not infinite. It resulted in the thesis claiming that it is necessary to reduce population growth to solve global problems. Based on the report, the concept of "golden billion" emerged – this is the number of people that can live on Earth without causing it irreparable damage. The rest should either disappear or live

on the edge of poverty, being socially and economically isolated from the "chosen ones". In the same period, the concept of the "Malthusian trap" emerged – a situation in which population growth overtakes the growth of subsistence production.

A terrible example cited as an illustration to the notion of the Malthusian trap is the genocide in Rwanda in 1994, resulted in about a million people killed [19].

Rwanda is one of the most densely populated countries in Africa. However, agriculture there is still conducted using primitive methods, almost without the use of mechanization. It is not possible to achieve large yields, even despite the initially high fertility of soils.

This is how the authoritative American scientist Jared Diamond described the situation: "The whole country looked like a garden and banana plantation. Steep hills were being farmed right up to their crests. Even the most elementary measures that could have minimized soil erosion... were not being practiced. As a result, there was much soil erosion, and the rivers carried heavy loads of mud. One Rwandan wrote me, "Farmers can wake up in the morning and find that their entire field (or at least its topsoil and crops) has been washed away overnight, or that their neighbor's field and rocks have now been washed down to cover their own field." Forest clearance led to drying-up of streams, and more irregular rainfall. By the late 1980s famines began to reappear. In 1989 there were more severe food shortages resulting from a drought, brought on by a combination of regional or global climate change plus local effects of deforestation" [20].

Despite the fact that virtually every square meter is cultivated in this country, "a median farm size of only 0.89 acre in 1988, declining to 0.72 acre in 1993. Each farm was divided into (on average) 10 separate parcels, so that farmers were tilling absurdly small parcels averaging only 0.09 acre in 1988 and 0.07 acre in 1993" [20]. These average figures, revealing in themselves, conceal a huge number of problems. Naturally, first of all, land was not distributed equally. There was social inequality, which has increased over time. However, both the poor and the rich in this country had almost nothing. A farm of only 1 ha was considered very large. Little farms were

as small as 24 ares (1 are is equal to 100 m²), which was an extremely small area per family in the absence of mechanization and the relentless depletion of land year after year. In fact, it is believed that the minimum amount of land needed to feed one person is 6 ares. At the same time, poor farmers with small plots mostly had no additional income, such as trading, sawing trees, making and selling bricks, working on construction sites, etc.

Due to the lack of free land in the community, young people could not leave their families and start their own households. By 1993, 100 % of men aged 20–25 continued to live with their parents. On average, 5–6 people fed from one such farm, getting no more than 77 % of the required (by the most modest Rwandan standards) calories. Almost half of the country's population was on the verge of starvation. There were many other points of tension in the society. Parents were unable to provide for their children, who in turn were in conflict with each other over the right to land plots, resulting in constant quarrels over inheritance. The relations between neighbors were complicated as well.

Against this backdrop, the class-ethnic conflict between the two peoples of Rwanda (Hutu and Tutsi) lasted for decades, with periodic bloodshed. With the outbreak of the civil war, the tension between them reached its climax and culminated in massacres committed with great brutality. Although formally the aggression had the character of genocide against the Tutsi, the reality was different. Let us quote Jared Diamond again.

“The distinction between Hutu and Tutsi is not nearly as sharp as often portrayed. The two groups speak the same language, attended the same churches and schools and bars, lived together in the same village under the same chiefs, and worked together in the same offices. Hutu and Tutsi intermarried, and (before Belgians introduced identity cards) sometimes switched their ethnic identity. While Hutu and Tutsi look different on the average, many individuals are impossible to assign to either of the two groups based on appearance. About one-quarter of all Rwandans have both Hutu and Tutsi among their great-grandparents... This intergradation gave rise to tens of thousands of personal tragedies during the 1994 killings, as Hutu

tried to protect their Tutsi spouses, relatives, friends, colleagues, and patrons, or tried to buy off would-be killers of those loved ones with money. The two groups were so intertwined in Rwandan society that in 1994 doctors ended up killing their patients and vice versa, teachers killed their students and vice versa, and neighbors and office colleagues killed each other. Individual Hutu killed some Tutsi while protecting other Tutsi. We cannot avoid asking ourselves: how, under those circumstances, were so many Rwandans so readily manipulated by extremist leaders into killing each other with the utmost savagery?” [20]. The scientist's answer is that Rwanda was caught in a Malthusian trap, meaning it was necessary to get out of it one way or another.

However, Jared Diamond recognizes that demographic situation alone would not have had such dire consequences as the genocide. The Hutu elite who seized power used the plight of the people and the accumulated resentments among them to strengthen their own positions. They resorted to a variety of tools, including deliberate provocation and, of course, propaganda. The latter had such a powerful effect that, as in Hitler's Germany, people subsequently accepted the tragedy as a necessity and found thousands of explanations for it. Diamond quotes a local resident who lost his wife and four children in the genocide. In his opinion, the reason was not the order given by the “elite” bathing in luxury and struggling for power, but the fact that “the people whose children had to walk barefoot to school killed the people who could buy shoes for theirs” [20]. However, such a thing would not have happened if the authorities had not armed one part of society against the other and legalized the killings. Therefore, the reference to Malthusianism, as in the case of the famine in Ireland and the threat of famine in Germany, is nothing more than an attempt to justify unnatural cruelty by natural causes.

Some European countries have population densities around the same level as Rwanda and, for example, Monaco and San Marino have significantly higher densities. As of data for 2018, Rwanda has almost as many people per 1 km² as the Netherlands. In the African country it was 420 people, while in one of the most prosperous

European countries this figure is 402. It turns out that it is not at all about the number of people and the land they live on. In the modern world, and even more so in the future, this factor will continue to play an important role, but it can be largely compensated by other circumstances. Technical equipment, economic and political organization of the society are decisive.

Even Karl Marx argued that social disasters are caused not by quantitative territorial and demographic conditions but by the methods of production and distribution of products. Analyzing the famine in Ireland, he saw the main reason not in the fact that there were too many people in the country but in the fact that landowners simply drove people off the land, believing that it would be more profitable for them. However, as a result of the country's population almost halving, the live of Irish people didn't significantly turn for the better. According to Marx, capitalism makes a large part of the working class redundant and leads to the impoverishment of the proletariat even without population growth. Increasing the reserve army of the unemployed is a necessary condition of capitalist production because it creates pressure on workers forcing them to sell their labor at a minimum price, which allows the owners of industries to obtain a greater surplus value of production and increase capital.

Convincing arguments against the Malthusian theory were offered by representatives of the so-called new institutional school. Analyzing the reasons for sustainable economic development in European countries, when population growth was accompanied by an improvement in living standards and income growth, they concluded that the main reason for this was a change in the distribution way of the labor results. According to their understanding, the plague epidemic that occurred in Britain in the 16th century not only reduced the number of people but also weakened the institutions of serfdom. Peasants were able to retain more of their crops for themselves than before. Then, after the Glorious Revolution of 1688, England moved towards the development of pluralistic institutions, which allowed ordinary people to participate in the country management and earn income from their enterprises (including patents for inventions).

This was just the reason for the beginning of industrialization, as a result of which the laws discovered by Thomas Malthus ceased to work.

The Malthusian theory has proved to be true only for societies in which a significant part of income is appropriated by a small group of people who constitute the "elite". Under such conditions, the majority of people have no interest in increasing labor productivity. The product will be appropriated by others anyway. Only a fair (at least relatively) distribution system can make the masses work more efficiently. In this case, the creation of conditions that motivate to produce more output leads to a constant increase in labor efficiency, and population growth does not turn into a decrease in living standards. Nevertheless, Thomas Malthus' idea is very tenacious and is only gaining popularity.

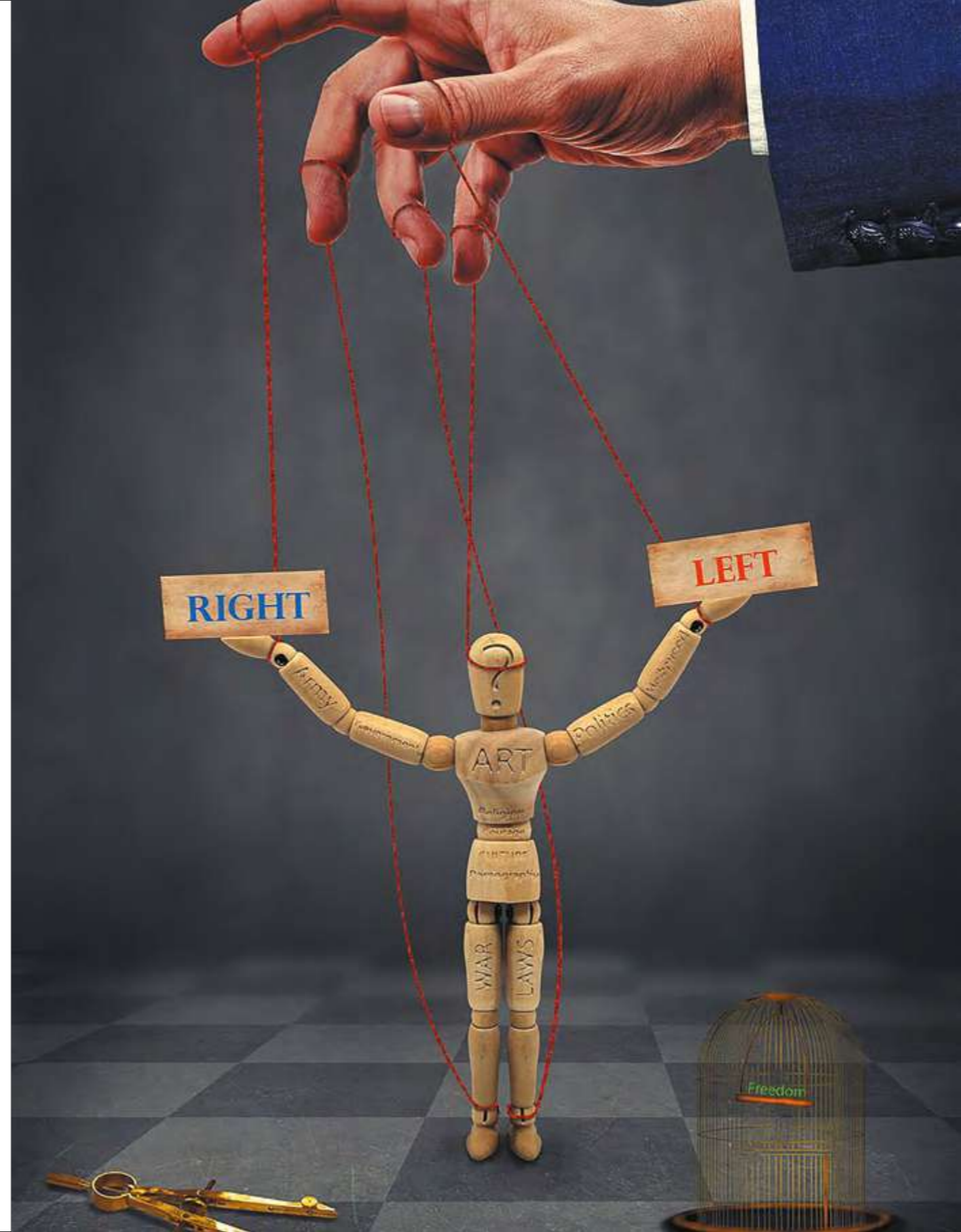
The problem of overpopulation in the 21st century is considered to be one of the main challenges along with climate change, global warming and biodiversity reduction. This subject is actively discussed by well-known politicians, international organizations and mass culture.

Back in 2007, Boris Johnson, still just a politician, who became the Prime Minister of Great Britain in 2021, called overpopulation "the real number one issue" [21]. The Great Reset program announced in 2020 by Prince Charles and the delegates of the World Economic Forum in Davos, although does not directly set the task of reducing the world's population but obviously implies it. It is quite clear: it means that the representatives of the countries whose inhabitants belong to the "golden billion" will reduce the population of those countries that are not among the chosen ones. Thus, if we call spade a spade, there are plans for social engineering or a new form of genocide, which humanity may face in the 21st century. Fortunately, Malthusian ideas are not shared by everyone. This gives us hope.

Under the UN report presented in 2019, the population growth rate is constantly decreasing. Thus, by 2100, this indicator will finally stabilize at 11 bln people [22]. According to the University of Washington projection, published on July 14, 2020 in the medical

journal *The Lancet*, the world population will peak in 2064 and reach about 9.73 bln and then decline to 8.79 bln by 2100, which is 2 bln less than the 2019 UN projection [23]. Researchers at the Fraser Institute in Canada tend to believe that overpopulation of the planet and the danger of resource depletion are myths because technological advances have made resources more accessible and abundant than ever before [24]. Dr. Heather Alberro from Nottingham Trent University stated that the subject of overpopulation is an attempt to hide the true source of all environmental problems of our time. It lies in “the waste and inequality generated by modern capitalism and its focus on endless growth and profit accumulation” [25].

The representatives of the world capitalist elite are not interested in neither any fundamental changes in the system nor in the search for new directions and ways of development, but wish above all to preserve their position, increasing their power and capital if possible. This pseudo-elite (it so happened historically) was spontaneously and randomly assembled from politicians, bankers and rich merchants. Among them there are no engineers or, at least, philosophers, capable of complex and systematic thinking on the planet’s scale. So, according to their professions and views inherent to their competences, they will lead our civilization only to the place where here and now it is possible to get fabulously high profits on global problems of humankind – not for everyone but for them in the first place. Some of the most radicalized researchers even assert that corporations are artificially restraining space exploration because space projects lead to an increased role of the state, which goes against their interests. “Therefore, globalists, on the one hand, need to take charge of the process of space exploration and profane it. This task is performed by PR illusionist Elon Musk with his unprofitable companies that exist on American taxpayers’ money. On the other hand, they should eliminate the reason for the need in space projects. It is necessary to provide the inhabitants of Earth with enough living area on their home planet. It is impossible to enlarge the planet” [26]. On this basis, the idea of combating overpopulation is promoted.



This program is well-funded, has an impressive lobby at the highest levels of decision-making and a huge resource in the form of scientists and engineers who serve capital, inventing and developing ever more sophisticated ways of slow, as stealthy as possible, yet efficient and the most widespread genocide in the history of civilization. The realization of such a plan could be the end of this history. Just as Hitler's war unleashed for the interests of Germany led to the destruction of the country, so the pseudo-elite, opposing itself to all others, will eventually destroy itself, making our world unfit for human life. At the reckless pace of development of Earth's industry achieved by the end of the 20th century, humankind has a couple of generations left before the point of no return. However, it may be too late if nothing happens in 30, 40 or 50 years. Then, the gun called Industry, hanging on the wall of our house named Biosphere, will fire a shot at the head of the self-murderer, Human Civilization.

The problems of exceeding the limits of growth and overpopulation of the planet, presented by globalists since the 1970s as the main ones for humanity, are a smokescreen behind which they hide other real problems, namely, the problems of the limits of growth of capitalist production and the limits of its human capacity.

Capitalism is a system in which the few thrive at the expense of the many; the center is enriched by using the resources of the periphery. The basis of the future postcapitalist system is that it will not be for everyone either. This "brave future" is intended (which is carefully hidden) only for the "brilliant million", next to which the "golden billion" of digitized indentured servants, i.e., bio-digital convergents, will "subsist" while serving. This is on the one hand.

On the other hand, the automation of production leads to the fact that for capitalism the labor needs come down to rather low figures. Those involved in production are useful. They get paid for their work, and they are also consumers. But the remaining several billion are something like annoying parasites that need to somehow, more or less, be alimented, and who, on top of all, pose a real threat to the system: if there's anything, they can rebel at any time.

The more population there is that has to be fed by the capitalist system, the more unstable it becomes. This is what the Marxists called

the main contradiction of capitalism: the contradiction between the social nature of the production process and the private capitalist form of appropriation of the results of labor. That is, everyone exists within the system, but only a few can live well, and the more there are those who cannot, the more likely it is that this poor majority will overthrow and destroy the rich minority.

That is why when the "global elites" talk about overpopulation, they are not at all concerned about the depletion of the planet resources – in fact, they know that there are technologies today that may solve this multicomponent problem. This is how they take care of the preservation of their wealth and dominant position. This is the real meaning of "sustainable development" for them. They play with concepts to achieve their real goals. When it comes to the limits of growth for capitalism, they talk about the limits of growth in general and find ways how to achieve their goals and at the same time also make money on this. This is their black magic. This is the plan of the global pseudo-elites.

Therefore, a "new reality" is systematically being formed with a "new serf" – a human-like creature without properties who is easy to control and manipulate, at the level of animal reflexes, namely: asexual and soulless, without historical memory and without identity, without conscience and without morality, without a family and without children, without the meaning of life and without goal-setting (except for the sense of consumption, and not so much real as virtual and emotional).

One should not see in these plans any sort of plots and conspiracy theories. There is no conspiracy. "Global elites", by masking our faces, the faces of billions of people around the world, unmasked theirs. They do not hide their intentions, they talk about them openly. Anyone can see for themselves. One has only to set a goal and spend a little time. For example, you can read the book "COVID-19: The Great Reset" and other works by Klaus Schwab [27, 28] – one of the ideologists of globalists and permanent head of the World Economic Forum in Davos. Below are just a few quotes.

"The world will no longer be the same, capitalism will take on a different form, we will have completely new types of property

in addition to private and state. The largest multinational companies will take on more social responsibility, they will be more actively involved in public life.”

“Governments must also adapt to the fact that power is... shifting from state to non-state actors, and... to loose networks. ...Increasingly, governments will be seen as public-service centers.”

“...The greater population growth is... the higher the risk of new epidemics.”

“...If both democracy and globalization expand, there is no place for the nation state.”

“...The containment of the coronavirus pandemic will necessitate a global surveillance network.”

And so on... For example, the Prime Minister and Prince of Great Britain, US President Joe Biden and others have not hesitated to declare their agreement with Schwab’s theses [29]. Obviously, the heads of transnational corporations will also not be against such a program that clearly expresses their interests.

In support of the above, we can refer to a detailed analysis of the utter futility of the socio-economic vector along which our civilization is developing, led by “deep power”, as conducted in numerous works and speeches in the field of economics, nature management, ecology, sociology and politics of such independent researchers as M. Khazin, V. Katasonov, O. Chetverikova, A. Fursov, V. Boglaev, I. Shnurenko, A. Dugin, S. Pereslegin and others [30, 31]. I became thoroughly acquainted with their views as well as their analysis of the world situation, our past, present and foreseeable future during the pandemic, while in partial self-isolation at our innovation center “EcoTechnoPark”.

The developers of the Great Reset program actually plan to zero out the technocratic vector of human development, formed over many previous millennia, as well as to zero out the human technogenic civilization itself – the one we know and form part of. Beneficiaries of capitalism, whose crisis as a system by its socio-economic nature has taken place over the past several decades, are trying to camouflage it as the crisis of humanity – the planetwide technogenic society created in the era of capitalism.

“Global elites” led by the USA and Great Britain, by the hands of the world hegemon, are destroying and annihilating countries and nations. Iraq, Libya, Syria, Afghanistan are the states that did not want to walk the same road with them and therefore turned out to be undesirable. No one now even remembers the two atomic bombs dropped on Japan (although there was no need for it) or the Korean and Vietnam wars...

The destruction of civilization occurs not only directly but also implicitly. First of all, it is done through the environmental movement with quotas and bans introduced around it. Such measures are aimed at slowing down the industrial development of countries beyond the borders of the Collective West. Because of all kinds of environmental sanctions, it is too expensive for them to build and run factories. The growth of the economy slows down, and the standard of living and quality of life decrease. Earlier, in the days of Thomas Malthus, this factor was not a determining factor for the growth or decline of the human population, but now it is very important – all thanks to mobile digital devices and global informational monopolies.

There are already many studies showing that the proliferation of smartphones and access to information has a direct impact on a person’s view of themselves, their life and how many children they should have. Looking through Instagram and Facebook feeds, people see pictures of a “beautiful life” and set their sights accordingly. They strive for comfort, want to build a career and be successful, and the presence of a large number of children in these plans rather hinders than helps. Especially if the country’s economy is not developing and does not meet the new demands. The whole chain looks devilishly graceful. Because of environmental restrictions, industry does not grow, the economy does not grow, but informatization flourishes, which together leads to a decline in the birth rate. This is exactly as the pseudo-elites want it to be. In this way they throw off the human “ballast” from the biosphere ship “Life on Planet Earth”. In accordance with their idea of tomorrow, they deprive billions of people of their future – those who have already been born but will not give birth, and those who will not be born to please false satanic values and idols.

2.3. 5D Program

Humanity's way of life in the 21st century, along with the oppression of nature, is the cause of all past and future upheavals. All the wars and economic problems of the 20th century occurred because of overcrowding and a persistent desire to consume as much as possible, resulting in the escalation of the struggle for resources and spheres of influence. This struggle is one of the essential elements of a capitalist system based on profit and around profit.

In general, the capitalist system implies the need for and imminence of crises, each leading to more disastrous consequences. Most economic experts agree with this opinion. Currently, the knowledge about this has become widespread, right down to the layman's level. Accordingly, there is a demand for the reform of capitalism since the "global elites" do not accept alternative models, like socialism. After all, these are the capitalist elites, and they cannot disown themselves.

Since experts mainly associate crises with overproduction of goods, these crises can be avoided only if we change the nature of production and consumption. Before exploring how the "elites" intend to arrange the new world, it is necessary to understand how all this happened before, in the most general terms.

Enterprises manufacture goods, pay workers for their labor and keep the added value to spend on product development, plus their own needs, including their need to pay taxes. That said, the goal of production is to increase profits, which is achieved by optimizing technological processes, reducing the cost of labor and increasing the number of manufactured goods.

Therefore, the production volume should always increase, and the relative wages for labor should decrease. At the same time, workers are buying most of the products. If they earn less, they buy less. Yet, producers continue to create more and more goods and services. There are so many of them at some point, so nobody needs them, and the manufacturers cannot sell enough products to pay off the investments. Then they opt for staff redundancy, assembly line shutoff and production minimization.

The economy sinks into crisis. Then someone goes bankrupt, someone optimizes something, prices drop for the accumulated surplus of goods, warehouses once chock-full of products gradually empty, and then there is a demand again that exceeds supply. Everything is repeated at a new round. Of course, a war or a pandemic can significantly mitigate the situation. In a short time, they create new market outlets, job opportunities, requests for specific product ranges, orders, etc. That is precisely the reason why wars begin at the moment the economy reaches its peak; it is not an effect of power excess but a way to avoid the upcoming steep and painful fall from the top. Is it possible to prevent crises in some other way? It is believed that yes.

It is assumed that it is possible to improve the capitalist system, to make its development not cyclical (from crisis to crisis) but sustainable. To do this, it is enough to arrange production and consumption in such a way that they are always balanced and orderly. Of course, not in the logic of a planned economy, but with the possibility of preserving the power and wealth of capitalists.

Digitalization should come to the rescue, being a digital transformation of society and the economy. Most notably, it's about internet technologies, big data processing technologies, virtual and augmented reality, artificial intelligence, 3D printing, printed electronics, blockchain, quantum computing, etc.

Digitalization will help to get total control and accountancy: what and how much is in production, what and how much is purchased. It will also form the basis of a new (inclusive, in other words "universal") capitalism, where ordinary people will no longer own anything as private individuals; they will only have access to services. Because life will turn out to be unthinkable over time without these digital services, the demand for them will become constant, increasing in proportion to consumption without any fundamental restrictions (as everything starts to happen in a virtual digital environment, not in a limited world of material objects, there will be no restrictions).

Digitalization is one of the five pillars on which a new world order is in the making. One can also speak of the four "Ds": desocialization,

deindustrialization, decarbonization and depopulation. With their large-scale postcapitalist deployment, these vectors of development proposed by modern capitalism are likely to ensure the stable development of the system. However, this “brave new world” will turn out to be horrific from the point of view of 7 bln people for whom there is no place. The substance of such plans is as follows.

Digitalization is the basis and is a dreadful tool within the logic it is developing today. It includes the following:

1) introduction of widespread accounting and control systems for production, services, banking and so on, which will lead, in the end, to the establishment of total control over the “wrong people” and the transfer of civilizational functions to supposedly smart but in fact to primitive artificial intelligence, which, from an engineering point of view, is by several orders of magnitude below the complexity of the simplest microorganism structure, such as coronavirus;

2) accelerated introduction of bioengineering technologies, the mass production of robots, the promotion of genetic mutation projects and species crossbreeding as well as the interbreeding of people, artificial intelligence and machines, which will lead to a gradual transformation of the human personality into a soulless human-like creature, into a cyborg, a bio-digital convergent.

Desocialization is:

1) establishment of a new policy glorifying minorities (social, ethnic, racial, biological, gender, etc.) where they dominate over the majority;

2) subordination of humanity to liberal values, opposition to critical and analytical thinking of people, deprivation of privacy and civil rights, total censorship, complete control and manipulation of the media, social networks as well as consciousness, ideology, education, science, culture, art and religion. After all, frail and dying capitalism needs primitive convergent consumers, not creative individuals. Moreover, there will be a gradual decrease in the role of nation states in society and the transfer of most of their functions to global corporations;

3) fight against natural childbearing, the elevation of bodily and spiritual ugliness and perversion, depravity and lust, mentally and physically disabled people to an ideal of harmony and beauty;

4) destruction of family and nation-states’ institutions which must be replaced by global (supranational) corporations that have entered the totalitarian phase of their development;

5) expanding influence of transnational pharmaceutical corporations, Big Pharma, the likes of which are not interested in human health since only ill people can bring profit;

6) incremental and consistent introduction of a guilt complex into social consciousness during many decades that is a complex of personal and collective inferiority. We, ordinary people, who are the overwhelming majority, are forced on all continents to repent, to feel guilt, inferiority and faultiness at the slightest pretext:

- for the fact that we are not homosexuals;
- for the light (or dark) color of our skin;
- for our nationality;
- for eating meat and opposing genetically modified and artificial foods;
- for doubting the benefits of vaccinations and the existence of pandemic at all;
- for having mothers and fathers, for using “man” and “woman”, “he” and “she” words;
- for being healthy and not disabled;
- for the fact we don’t blindly believe in global warming and the carbon greenhouse effect...

The list of our “guilt” goes into infinity. In its social essence, it is a psychological terror unleashed on every person and humanity.

Society is gradually and consistently turning (or rather, it is being transformed) into a kind of turbulent, albeit skillfully managed, set of minorities dissatisfied with life, who initially, from early childhood, are offended by the “alien” majority. The majority of society, even to the detriment of its own interests, is obliged constantly to take care of these offended people. Moreover, the interests of minorities,

including their fanatical desire to dominate the majority, should not be questioned or criticized, otherwise this immediately falls into the category of racism, homophobia or xenophobia.

The fact that democracy, as it has been interpreted in the 21st century, is the power of the minority over the majority, was a revelation to me. Although it turned out that for the ideologists of the global liberal and capitalist system, this is an accepted and evident axiom. Such a perverted view, essentially turning everything upside down, reminds me of the story of a cancer cell that, with its “unconventional values”, misleads and deceives the weakened immune system of a healthy organism with trillions of normal cells and ultimately kills its master by metastasizing into all organs and dies itself.

The displacement of small companies and industrial enterprises from the market will lead to the emergence of global monopolies, free to dictate any favorable conditions to the consumer.

The erosion of the functions of the state and their transfer to global corporations will lead to a revision of social policy and social hierarchy. For example, why pay pensions? And, in general, do corporations need disabled older adults and children, hospitals and roads or the entire social infrastructure? Consumption, childbirth and other manifestations of human life will have to be rationed by the new standards to support the “sustainable development” of the proposed “brave new world”.

Reducing the importance and role of the state and its abolition is necessary for the beneficiaries of capitalism to pay fewer taxes. At the same time, it serves to increase the demand for goods and services provided to the population in many countries at the expense of these same taxes. I’m talking about removing the intermediary that reduces the efficiency of the capitalist system and adds unnecessary variables. In essence, the reanimation of Trotskyism should take place. Its idea is laid in a phrase: “The technology of establishing global power by eliminating the nation states and other organizations competing with the global power.”

Desocialization and detaching from society makes everyone unprotected in the face of global corporations, depriving them of the hope of receiving help and support from loved ones who

could pass on to them specific necessary knowledge, experience, goods or services. So, naturally, they will have to singlehandedly purchase everything they need. As the consumers, they become much more reliable and efficient from the standpoint of making a profit from them.

That is why, under various glib excuses, there is an accelerated elimination of competitors of global corporations – small and medium businesses, personal and private property – with the transition to a supposedly more “advanced” sharing economy.

Deindustrialization is:

1) redeployment of almost all sectors of the world economy into a vague and opaque sphere of environmentally safe production, plus the monetization of the environment to benefit elite of globalists. As a result, there is a widespread change from traditional nature conservation activities to environmental extremism;

2) accelerated reduction of industries and workplaces, creating a civilizational “digital concentration camp” with a global lockdown and payment of guaranteed basic remuneration, i.e., minimum “ration”, to those who do not work;

3) curtailment of the traditional (natural) production of agricultural products and a transition to genetically modified foodstuffs, in particular a defective composition and the quality of artificial meat, which could be dangerous to human’s health. One of the main arguments is that a cow is allegedly more environmentally hazardous than a car and an airplane since it emits many greenhouse gases, including carbon dioxide and methane, that is why the humanity will be supposedly compelled to renege on beef in the near future.

Decarbonization is the rejection of hydrocarbon fuels (oil, coal, natural gas) and CO₂ emissions into the atmosphere, replacing them with technologies purported to be green but ineffective and environmentally even more dangerous.

Decarbonization and deindustrialization are interrelated elements of the same program. In a broader view, they refer to the monetization of ecology and its transformation into capital. For example, people and businesses must pay for what we need most, such as water and air,

the value of which becomes part of the surplus value. As a result, the demand for this product will stabilize, reducing the risk of overproduction. On the other hand, the slowdown in industrial development is a high road to a decrease in the population's real income and, consequently, to a population reduction. It satisfies one of the goals of the "elites", also known as **depopulation**.

The "sustainable development" thesis of the Club of Rome assumes an accelerated reduction in the world population to the "golden billion", even down to 500 mln [18]. Hence is the special operation "COVID-19 Pandemic" with protective masks and widespread lockdowns that destroy families, the immune system of people, voluntarily and forcibly placed in a "home prison", and destroy medium and small businesses – the basis of the economy of any country.

Matrix RNA vaccination, yet to be adequately studied for long-term consequences, is supposedly the most "humane" self-imposed method, which logically fits into depopulation. Over time, this can lead to irreversible genetic changes in the vaccinated organism, negatively affecting the male and female reproductive organs. In its social essence, such "treatment" can be used, if necessary, as "velvet genocide", i.e., prolonged murder. Although, most likely, we will never know when such "necessity" will come.

In the theories we've been fed, vaccination leads to collective immunity, although, in the documents of the World Health Organization, this is called "herd immunity". Humankind is just a herd in which natural immunity, that is beyond the control of third parties and has been polished over billions of years of evolution of life on the planet, should be replaced by artificial immunity controlled from the outside. So, we get hooked on mandatory vaccination – a strong addiction to a lifelong intake of questionable vaccines, constantly mutating. It will become another step towards turning people into cyborgs.

Depopulation is necessary because capitalism is a social system that only needs a small number of people to function due to the automation of production and similar innovations. Moreover, an excess of human biomass is dangerous for the system since those individuals who are not involved in production will nevertheless

need goods and demand them. Therefore, it is better to optimize the size of the population, even at its own expense, in such a way that it would provide sufficient volumes of demand and involve producing what it consumes. The people should be able to feed themselves and simultaneously guarantee an increase in profits and luxury to the "global elites" but nothing more.

Looking further and describing a transition that has already happened, theorists say that humans are no longer the primary consumer of products. The actual situation today is simplified: one company produces metal and sells it to a company that manufactures robots. Then the same metal producers and other companies buy those robots as, for example, machine tools. In the end, robots make robots for robots. Humans may not be involved in these processes at all.

The world order described above is a global digital concentration camp, digital fascism. The system, offered to us as an image of an inclusive future, will be strictly ordered and self-sufficient. The main difference between such a "brave new world" and the existing world order is "stability", as opposed to cyclicity. That is why globalists repeat words "sustainable development" like a mantra, sounding as a spell from black magic. At the same time, they use every effort to pretend that their actions are motivated only by global environmental problems and concern for people. Of course, the motivations are different, but ecology is a good product and perhaps the best planetary business resource available.

I have found evidence everywhere that what is happening, including the coronavirus pandemic, is part of a deliberate and steadily implemented program. For example, Prince Philip, the husband of Queen Elizabeth II, one of the ideologists of the decrease in the planet's population, talking about his rebirth back in 1988, said: "In the event that I am reincarnated, I would like to return as a deadly virus, to contribute something to solving overpopulation" [32]. How much do you have to hate humanity to say such a thing?

On October 18, 2019, months before the announcement of the actual pandemic, the Johns Hopkins Center for Health Security, the World Economic Forum and the Bill & Melinda Gates Foundation

held a pandemic exercise called “Event 201”. Business, government and medical representatives discussed the specifics of a coronavirus pandemic, which will spread from bats to humans. It was supposed that 65 mln people would die from the infection over 18 months. The pandemic would continue until an effective vaccine was born or the number of recovered individuals reached 80–90 %. At the same time, the world economy will collapse by 11 % [33].

Information about this is publicly available, a script, videos from the scene, final recommendations and more can be easily found. Although the exercise occurred months before the epidemic, the description of the situation came to fruition. An “esteemed” validity check expert, the British organization FullFact, refutes the assertion that the exercise was a rehearsal for the COVID-19 pandemic. It is noteworthy that among the founders of FullFact are such companies as Facebook, Google and the Open Society Foundations of George Soros. Interestingly, the same platform gets credit for refuting a series of scandalous news stories directly or indirectly related to the pandemic, depopulation and the role of the “global elites” in them.

Such facts include a widely circulated online quote dating back to 2009 and attributed to former US Secretary of State Henry Kissinger: “Once the herd accepts mandatory forcible vaccination, it’s game over! They will accept anything – forcible blood or organ donation – for the “greater good”. We can genetically modify children and sterilize them – for the “greater good”. Control sheep minds and you control the herd. Vaccine makers stand to make billions, and many of you in this room today are investors. It’s a big win-win! We thin out the herd and the herd pays us for providing extermination services. Now, what’s for lunch?” [34]. Kissinger, in 1974, prepared a secret report (Memorandum 200), which said that population growth in the least developed countries concerns US national security. Therefore, the proposal came forth to give paramount importance to ensuring birth control and downsizing the human population [35]. This document has formed the basis of the official policy of the United States since 1975, later declassified in the 1990s.

Regarding the rebuttals given by supposedly reputable organizations like FullFact, I believe this is part of an extensive information game in which IT corporations can play with the facts in any possible way. They banner whatever is convenient and do their bidding. If something is not profitable, they declare it fake, conspiracy or elements of conspiracy theories. Who can stop them when the media, social networks and search algorithms are all in their hands? They can even shut down the US President’s account, as happened to Donald Trump. Shut up anyone they want. They can say anything, including calls for the physical destruction of entire states, their leaders and their representatives. That is what the Facebook management did when they announced that they would not block messages suggesting the assassination of Vladimir Putin, Russian ministers and the military. Whoever controls the information controls the world. They do today, which is precisely what biochemistry corporations do. Therefore, they may soon have as much total control over our bodies as they already have over our minds and senses today.

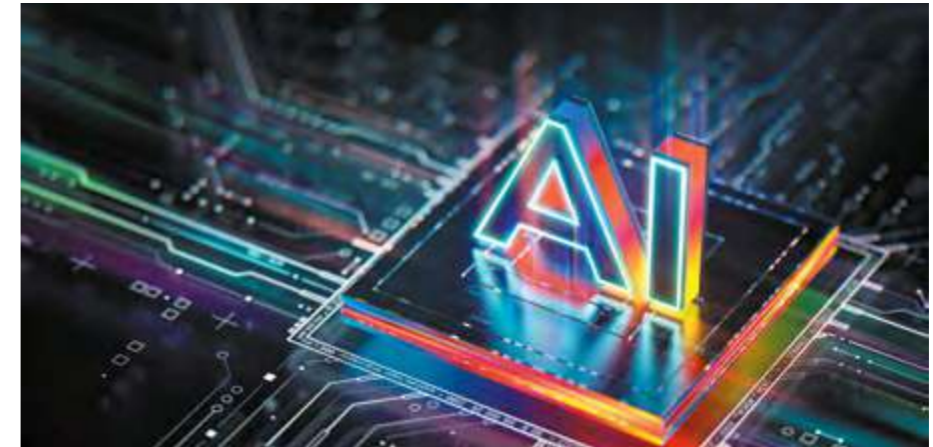
For 20 years, the “medical mafia” Big Pharma have been pursuing their goal to create a sustainable demand for their products within the framework of the new world medical order, in which a person is just a subject for experiments, something like a guinea pig. A vaccine is most suitable for this because its demand does not depend on market conditions. To do this, you must scare all of humanity, all 8 bln people, with messages like “Get vaccinated! Or you will die.” The demand has been secured for many years, necessitating the pandemic and a constantly mutating virus, combating which will require more and more vaccines. The coronavirus fits perfectly into this scenario, and obviously there was an order for it. Vaccine production plants have already been built all over the globe. It is obvious that no one intends to give them up, and this was a long-term plan. Again, a prominent figure among the lobbyists is Bill Gates. The principal investor in the pandemic announcer the World Health Organization, the primary owner of the corporation that supposedly invented the cure for the virus.

The prices of the vaccines that have become indispensable can be raised over time, providing long-term profits for the owners of the WHO. This organization has become an effective tool for extracting profit from each of us within the framework of another antihuman program, "Bio-Digital Convergence", which is being developed and successfully implemented by the "global elites" in the framework of the 5D program of gradual transformation of people into convergent cyborgs.

2.4. Pernicious Passion of Engineers for All Artificial Things

The central place in the 5D program is given to digitalization, which possibilities of implementation are related to the development of artificial intelligence. This relatively new phenomenon opens up amazing prospects. Applications for this tool are being sought in all areas, from household appliances to space exploration. And everywhere it is a question of finding a way to partially or completely replace humans with algorithms and the machines that execute them. Although this situation is formally and technologically new in many respects, it reflects the essence of our terrestrial engineering (industrial) civilization and embodies its characteristic attitudes.

The concept of "civilization" comes from the French *civilisation* (originally – the transformation of criminal proceedings into civil ones), then from *civiliser* – to civilize, from *civil* – civil, then from Latin *civis* – citizen [36]. Many people are familiar with the statement "*Civis Romānus sum!*" ("I am a Roman citizen!"). In Antiquity, it was a formula of self-assertion, the superiority of one group of people over all others as bearers of special rights and privileges. Even the poorest Roman citizens received free bread and access to public spectacles and therefore remained the elite. On the other hand, such a special position was based on their inclusion in the legal system – a system of laws that applied only to the Romans and required a special court for them, while others were outside the law and deprived of any legal protection.



Civilization begins where the law appears. It is it (no matter whether formalized or conceptual) that regulates the relations inherent to a civilized community, which differ from relations based on instincts or personal experience of a single individual in the animal world. At first, it is a law of tradition or nature, then – a legal law that has not only a limiting function but also contributes to the transfer of practically valuable knowledge. The procurement of fire, the manufacture of tools – the entire material basis of civilization rests upon knowledge of the laws of nature and the implementation of the algorithms of actions prescribed by them. The law and the algorithm as a sequence of operations are largely identical concepts. The Latin word *lex* (law) in one of the meanings is the order of actions [37].

The main mechanism of self-preservation and development of civilization is the maintenance of those engineering (industrial) technologies that lie in its foundation. Without hunting and gathering technologies, tanning hides and fire procurement as well as without other algorithmic actions, the rules of which are preserved and passed down from generation to generation, social development as an increase in the level of complexity of the organization of society would be impossible. The ordering tool in this regard is certain algorithms that subjects in civilizational processes obey. So, the laws of primitive tribes were built around the need to maintain fire. The industrial society serviced the machines. A person of the 21st century becomes at the service of artificial intelligence: performs functions related to the development of computing machine capabilities, the expansion of its fields of application as well as its maintenance, while simultaneously being a consumer of digital products. Here, in the process of alienation of labor described by Karl Marx, a new dimension opens up.

Until now, the alienation of labor has been built up in several stages: alienation from the instruments of production (they are owned by the capitalist, not the worker); alienation from the results of activity (products do not belong to the worker); alienation from the processes of performing physical labor procedures and from one's own physicality (the human body actually turns out to be

part of industrial equipment). This was followed by alienation from the ancestral essence (from ties with ancestors and relatives, with whom neither the land as an object of labor nor the ownership of tools of labor are no longer united) and alienation of people from each other. With the advent of artificial intelligence algorithms, a person became alienated from the elements of thinking and conscious abilities, from their own individual mind. Let us designate such a phenomenon as the calculator effect not only because these electronic devices quickly and qualitatively process numbers and perform complex computational operations (in its engineering essence, any computer is just a powerful calculator) but also because they are all the same – depersonalized, like any other machine.

2.4.1. Calculator Effect

The calculator effect is that in the process of performing mental operations, such as counting, some actions are carried out by a mathematical (digital) algorithm instead of a person. As a result, thinking becomes fragmented. In the course of forming a concept of the object, which cognition is basically the purpose of thinking, the essential stages end up missing out. The concept of the world becomes devoid of integrity, as the person themselves is alienated from thinking. Interestingly, one of the most successful brands of calculators is called Citizen. The word is derived from the Latin *civitas* (city), which goes back to the same roots as *civis* (citizen) and *civilisation* (civilization). The calculator is the same machine algorithm that replaces the individual in their main component as a biological being endowed with intelligence – the ability to think.

The described effect applies not only to computing activities. Algorithms are integrated into absolutely all mental operations: comparison, analysis, synthesis, abstraction, generalization. Getting to the destination, people use a navigator and may not even think about which part of the city they are in. There is a case when Japanese tourists in Australia drove a car into the ocean, although they planned to get to an island near the shore. They followed the navigator's instruction [38]. Similarly, when reading the news and searching

for the right information, people are increasingly being led by algorithms that record our preferences and issue recommendations for studying only those topics that, from the viewpoint of artificial intelligence, may be of interest to the consumer.

In communication, people are increasingly replacing entire blocks of conversation with videos and memes. Algorithms make coffee, do the cleaning, build cars and are already learning how to drive them, launch rockets into space and in seconds process volumes of data that humans won't be able to cover even in a lifetime. With the emergence of new technologies, society became more powerful, but there was less and less space for the individual in their natural manifestations. Let us call it the paradox of a civilized person. The less they are, the better and more powerful they become. We fulfill the laws the better, the more we subordinate our lives to them. For an ideal performance, it would be good for us to disappear altogether – first reducing to the “golden billion”, then to the “diamond million”, which will then inevitably degrade as a society and become zero.

2.4.2. Natural and Digital Thinking

Civilization comprises a setting to replace the individual with algorithms and machines because human is a natural being. In the same way, asphalt replaces grass; tractors and cars replace horses; communication on the internet replaces live contact. Civilization aims to replace the natural with the human-made. The creation of artificial intelligence is a necessary stage in the development of the so-called civilized (but by no means civilizational) community. And the root cause is technology and engineering technologies being at the heart of everything. They exist according to the same principles as Live Nature (living organisms), having raw materials and energy at inputs and useful products (services) and technological waste at outputs, while following the scheme: (raw materials + energy) – product (service) = waste. The difference is that the waste of technical production cannot be used by technology or life to the fullest, as it happens with the waste of living organisms.

The entire biosphere, with human being only a small part of it, is formed from life waste: biohumus, which contributes to the fertility of previously lifeless soils; oxygen, which we breathe and which ensured the creation of an ozone layer saving life on the planet; carbon dioxide, thanks to which a greenhouse effect appeared, which increased the average temperature on the planet by 32 °C, without what neither the biosphere nor us would exist, since all the oceans would remain covered with ice [39]. In contrast, the technosphere's waste products damage the biosphere because they are poisonous antagonists and take away the space that previously belonged to it – in the air, water and soil.

Thus, any technogenic civilization (terrestrial humankind is no exception here) not only replaces Live Nature but also fights with it and destroys it – first on the material level and then on the spiritual and social ones. By the same logic, material and informational raw materials turn into digital products as well as into material and informational waste, which increasingly fills up the living space and living thinking with digitalization.

The raw material for thinking is information or data (quantitative and qualitative). Through their processing, we form perceptions, beliefs, knowledge, worldview, goal-setting and array our actions on their basis. The by-product of thinking (waste) is also information, i.e., a digit. However, it undergoes changes in the thinking process. Compared to the informational raw material, informational waste changes its structure considerably, becoming organized according to the formal parameters of cognitive activity. Similarly, raw materials change their structure in technological cycles. For example, coal is used to produce such a product as heat and electric energy. The waste will be flue gases, ash, slag, sludge, etc. The chemical elements that make them up were also contained in coal, but now they are structured and correlated differently. At the same time, if coal (a former tree that lived on the planet hundreds of millions of years ago) first existed as a matter harmoniously integrated into nature, then from the moment of its extraction and through changing its structure, we get substances that violate the natural balance.

A similar process in nature does not lead to similar results. Waste products of all living organisms in the planet's biosphere are effectively integrated into food chains that end up in the fertile humus of the soil and then start again in the same soil on a new life cycle. The situation is approximately the same when comparing natural thinking with the digital one.

Natural thinking is the activity carried out directly by the human brain. Digital thinking is the work of computer algorithms. The specific features of the waste or by-products of the former are as follows:

- they can remain absolutely unfixed;
- the energy used to produce them is of natural origin and embedded in the natural energy exchange;
- once fixed, they can be efficiently incorporated into the thinking processes of other subjects.

The specific features of the by-products of digital thinking:

- they are mandatorily recorded on digital media;
- the energy used for their production is of artificial origin and violates the natural energy exchange established in the Earth's biosphere;
- a significant part of them is not integrated into the thinking processes of the subjects of natural thinking but, on the contrary, disrupts and destroys them, which is described in detail above through the "calculator effect" concept.

The algorithm that generated the *Cosmopolitan* magazine cover required the neural network to complete the task, based only on the text description as input data: "...wide-angle shot from below of a female astronaut with an athletic feminine body walking with swagger toward camera on Mars in an infinite Universe, synthwave digital art" [40]. In addition to the cover itself, which the research team found to be the most successful, at least a dozen other images were created. This is waste. Electricity was used to produce them. They are of no use to anyone and will never be used. Nevertheless, they occupy space on a server or computer hard disk, can be thrown into the internet and there, along with the necessary

and important information, will turn out to be just noise, an obstacle for searching the necessary material. In other words, they become noospheric informational garbage that invades the processes of natural thinking and pollutes it in the same way as the wastes of technological production pollute the biosphere.

2.4.3. Informational Garbage

The result of the fact that human has begun to transfer a significant part of thinking and creative operations to the algorithms of artificial intelligence for execution is the overflow of the information field with informational garbage. This leads to the degradation of natural thinking in the same way as the destruction of the biosphere is caused by its oversaturation with material wastes of the technosphere.

Informational garbage produced by the subjects of natural intelligence mostly appears when digital algorithms are included in the thinking and creative processes. Thanks to them, the creation of intellectual products is considerably facilitated: computer programs correct grammatical errors, can independently compile texts, perform graphic processing of images, make collages and perform editing of visual data, process and generate new sound tracks. Since the creation of an intellectual product appears to be greatly simplified, its quantity may exceed the actual needs. As in technological process: a product that is not consumed turns out to be a by-product, ceases to be a product and becomes waste.

The processes of creating non-disposable waste of thinking are cumulative. On the other hand, the products of natural thinking are forced to compete with the products of digital thinking. This is another mechanism for replacing the individual. Eventually the individual may be completely displaced. Firstly, there will be no need for the products of his thinking and creative abilities. Secondly, these abilities themselves will be unsuitable for efficient work under new conditions. In the abundance of informational garbage, humankind risks being unable to find the informational raw material necessary for thinking.

2.4.4. Mechanisms of “Escape from Freedom” in Industrial and Postindustrial Society

In the society of the 21st century, there is optimism about the expansion of artificial intelligence. There are involved the same mechanisms, which Erich Fromm defined as “escape from freedom” [41] and which earlier caused the emergence of totalitarian regimes and now may result in the emergence of a new type of social order – digital totalitarianism or digital fascism. Before describing it, let us cite a few quotes by the German sociologist referring to the processes and mental states that lead to social unfreedom and alienation from mind.

“The new freedom is bound to create a deep feeling of insecurity, powerlessness, doubt, aloneness and anxiety. These feelings must be alleviated if the individual is to function successfully” [41]. For the most part, people “cannot go on bearing the burden of “freedom from”; they must try to escape from freedom altogether unless they can progress from negative to positive freedom. The principal social avenues of escape in our time are the submission to a leader, as has happened in Fascist countries, and the compulsive conforming as is prevalent in our own democracy,” Fromm writes [41]. “Often he is well adapted only at the expense of having given up his self in order to become more or less the person he believes he is expected to be. All genuine individuality and spontaneity may have been lost” [41]. “By becoming part of a power which is felt as unshakably strong, eternal and glamorous, one participates in its strength and glory. One surrenders one’s own self and renounces all strength and pride connected with it, one loses one’s integrity as an individual and surrenders freedom; but one gains a new security and a new pride in the participation in the power in which one submerges. One gains also security against the torture of doubt” [41].

The above quotes describe the situation in the 20th century that led to the emergence of fascism in Europe. However, all these statements and observations are also true for the 21st century. The difference is that it is not the state, a political party with its ideology or a great personality of a leader but the algorithms of artificial intelligence and digital technologies lying at their basis that act

as an “unshakable eternal and beautiful force”. The individual of the 21st century, who in liberal countries is provided with a great negative “freedom from”, being unable to transform it into something positive, is ready to give up his or her “self” in order to gain confidence and be part of the great power of digital thinking.

The mass human appears ready to hand over to artificial intelligence the right and responsibility to make decisions in as many areas as possible. Let digital friends make routes for people, manage enterprises and stock markets, diagnose diseases and give recommendations on their treatment, choose music to listen to, books and news to read, movies to watch, count votes in elections and conduct trials, making supposedly objective and impartial decisions. Humans will only possess and use all of this and will be great because of the greatness of the incredible computing power that will be at their disposal.

With the help of algorithms, people will learn to improve genetic parameters before birth, and afterwards – to improve the human body by implanting chips and taking empowering drugs. They will be able to instantly learn complex professions and acquire the necessary knowledge, for example, through augmented reality systems and neural networks integrated into glasses, mastering new languages or learning to fly a helicopter. However, at the same time, they themselves, i.e., their ego, will be minimized as much as possible. On the one hand, they will become consumers, on the other hand, they will become slaves because a slave is only a tool serving the subject of thinking and decision-making. Slaves themselves do not think and do not make decisions.

Digital totalitarianism in the first quarter of the 21st century is no longer an anti-utopia but a new reality, the space of existence of which is steadily expanding, threatening to engulf the entire human civilization. Totalitarianism (Latin *totalis* – all, whole, complete ← *totalitas* – wholeness, completeness) is a political regime that implies absolute (total) control of the state over all aspects of public and private life. The ubiquitous introduction of gadgets and artificial intelligence algorithms is doing a job of providing control tools better than any acting police force ever had.

Digital totalitarianism is much more dreadful than all previously existing systems of this kind because the subject of power and control in it is impersonal. Instead of a human being (a politician, a policeman or a neighbor in a communal apartment), an artificial intelligence, allegedly neutral and objective, performs the functions of control and makes a number of decisions on encouragement or punishment. The average person cannot detect any evil intentions in its actions, which means that he or she can only accept what happens as a matter of course, as some natural forces, which, however, are not such.

The pessimistic scenario does not necessarily imply the revolt of machines and the physical destruction of people by them. It is likely that people will be eliminated in another way – mentally. They will simply cease to be thinking beings, delegating this quality to machines, and thus cease to exist as a species. This will be the end of the history of the rational human and beginning of the history of a digitized human, a bio-digital convergent.

2.4.5. Digitized Human

A digitized human is a potentially new species of living beings, a species of the genus *Homo* from the hominid family of primates. Under certain circumstances, they will be able to have a special physiological structure as well as appearance and behavior. Their main distinguishing feature is the introduction of various kinds of chemical preparations and electronic devices into the organism; the mediation of most of the mental processes by artificial intelligence algorithms integrated into the global informational network. In fact, the residents of technologically developed countries by the end of the first quarter of the 21st century already have many signs of a digitized human, the emergence of which is due to the increasing role of gadgets as well as the information received and processed with their help. A decisive step in the context of the assumed evolutionary leap should be the unification of biological and digital technologies into a single system for regulating the human condition and behavior. At the time of writing this text, humans have already

come close to this in terms of the technical feasibility of such a system [38]. If it is formed, the probability of global digital totalitarianism will increase by orders of magnitude.

In order to see more clearly the trend of replacing human beings by computers in the field of intellectual activity, let us cite statistical information [42], which reports that during the 20th century the level of intelligence on average has increased significantly. Such a phenomenon is called the Flynn effect, a statistical phenomenon that is expressed in the gradual increase of intelligence quotient (IQ) indicators over the years, both in individual countries and in the whole world. This process seems paradoxical: the growth was observed within decades, therefore, it is difficult to explain it by evolutionary and genetic factors as a literal “smartening” of the human race.

James Flynn showed [42] that from 1934 to 1978 the average IQ of US residents has increased by 15 points – about three points for each decade. Similar studies in other countries have yielded similar results. Thus, a New Zealand psychologist described a 20-point increase in the IQ of Dutch conscripts from 1952 to 1982. However, experiments conducted after 2000 showed a decline in the Flynn effect: IQ growth slows down, stops or is even replaced by a decline. In 2004, data on the IQ of Norwegian conscripts showed that the growth stopped after the mid-1990s and was replaced by a decline. Studies done in 2005 and 2008 found that the IQ test scores of Danish conscripts increased from 1959 to 1979 by three points per decade; during 1979–1989 they increased by only two points; during 1989–1998 they increased by 1.5 points; during 1998–2004 they decreased by the same 1.5 points. The situation was worsening thereafter. It is important that the turning point, when, after a long period of growth, people’s intellectual abilities went into decline, chronologically coincides exactly with the beginning of computerization of society. Natural thinking in the presence of an alternative (replacement) turns out to be simply redundant.

Civilizational development reaches its culmination, acquiring the possibility of replacing not only the natural environment surrounding humans but also the individuals themselves in their natural dimension. If we take into account that, thanks to this, humankind

gets at its disposal new unprecedented computational capabilities and a digitized human may seem superhuman to some, this situation is sometimes assessed as progressive. Some believe [38] that it is a good thing to transfer the function and the right to make key decisions to a sufficiently developed artificial intelligence. However, before agreeing with such statements, it is necessary to figure out whether artificial intelligence is capable of fulfilling the role which is held in store for it and which it is already assuming.

2.4.6. Fundamental Limitations of Artificial Intelligence

People think that an automated car control system is an intelligent system and, moreover, they are sure that an automated car is controlled by artificial intelligence. Is this really the case? Is a house in which you can open a window with the help of a smartphone really a smart house, even though it is uncomfortable and sometimes even dangerous for your health to live in it? Can we call a place where millions of people live and work a smart city, where “smart” “green” electric cars kill hundreds of residents, including children, on the streets every year, just as environmentally dirty cars equipped with internal combustion engines killed them in car accidents before? The soil under electric cars is also “rolled up” in asphalt, in them as well as in ordinary cars one should stand in traffic jams for hours and breathe carcinogenic fumes from sun-heated asphalt, wear products of tires and roadbed.

On what basis is electric energy considered the safest and most environmentally friendly, including that used for the electric cars? In fact, it is safe only at the point of its consumption, not at the point of its production:

- environmental disasters in Chernobyl and Fukushima are the result of industrial production of electrical energy derived from the atom;
- acid rains, global warming and destruction of the planet’s protective ozone layer are by-products of thermal power plants;

- flooded thousands of square kilometers of fields and forests are the result of the construction of hydroelectric dams, which not only block fish migration routes but also grind all living things with their turbines, releasing downstream nutrient broth for the reproduction of pathogenic microflora;
- windmills that kill millions of birds [43] because they cannot see the rotating turbine blades. In addition, the blades, with their capability of reaching the speed of sound, create powerful noise and vibrations (from low-frequency to high-frequency, which kill earthworms, the source of soil fertility) and make life unbearable for people even a few kilometers away due to these allegedly green power plants;
- buzzing wires of high-voltage power lines, under which it is impossible to grow anything or graze cattle, and it is dangerous for health to live and work nearby because of the powerful alternating electromagnetic field [44].

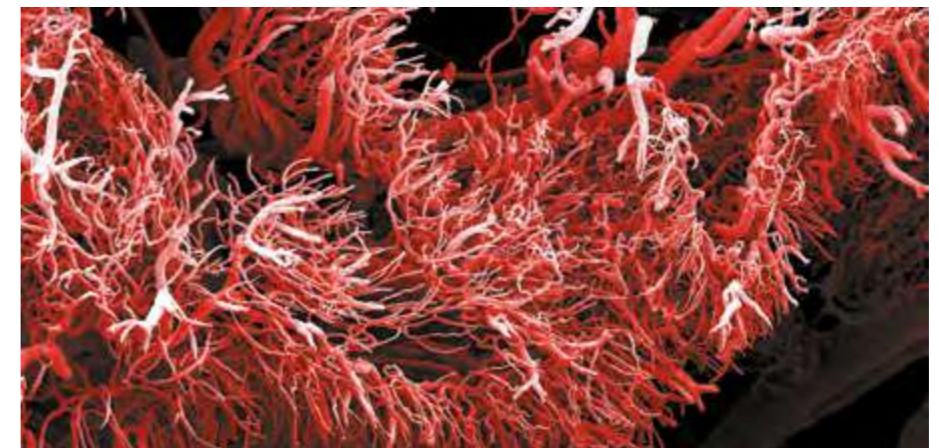
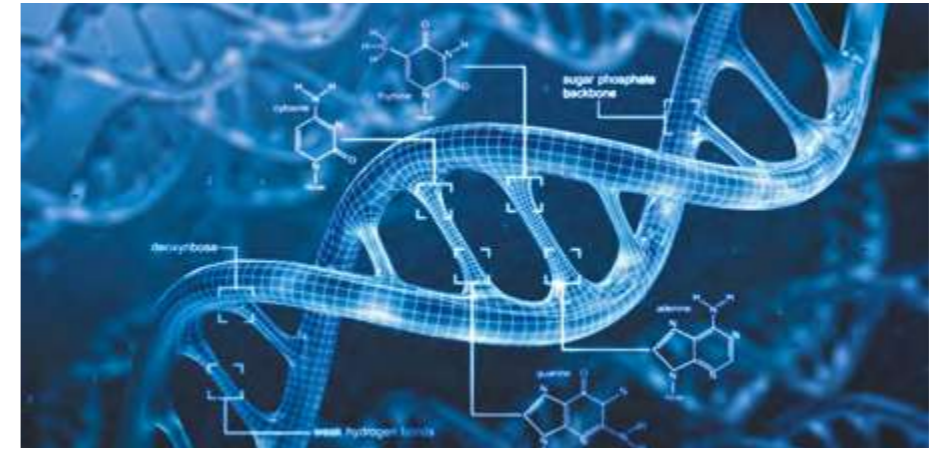
One can argue about how complex a mechanism an electric car is and how difficult it is to control it with six simple actions: “accelerator”, “brake”, “forward”, “reverse”, “left”, “right”. However, since the very notion of intelligence came from a *Homo sapiens* – the peak of perfection of living matter, it is necessary to find the essence of this term not in mathematics and physics, not in philosophy and business but in the concept of “Life”, i.e., in living organisms.

The basic structural unit of any living organism is the DNA molecule, in which all its genetic information is recorded. This molecule has hundreds of billions of parts – atoms of various chemical elements [45], embedded in well-defined places in a molecular-spatial structure of the highest complexity. An electric car, on the other hand, has only a few thousand parts. So, the DNA molecule is unimaginably complex from the engineering point of view – it is millions of times more complex than an electric car. DNA is even more complex than all the innovative technologies created by thousands of generations of people of our civilization (about 100 bln people who lived on the planet) over the long human history (more than a million years, starting from the invention of the first fire): bolts and nuts, bridges and skyscrapers, internal combustion engines

and turbines, rockets and airplanes, cars and railroads, computers and smartphones as well as thousands and thousands of other engineering technologies.

The DNA molecule is more complex than the entire nonliving part of our vast Universe (i.e., without planet Earth), which stretches for tens of billions of light years, consisting of trillions of trillions of planets, stars, galaxies and galaxy clusters. After all, the Universe, which, according to one of the theories, emerged from the singularity as a result of the Big Bang, was formed during billions of years (in the process of expansion of energy and matter in three-dimensional Space) randomly under the influence of the physical laws that emerged in the singularity, in particular gravity, which people then called the laws of physics – they are the “genes” that created our Universe. Such dead (i.e., nonliving) physical “genes” can be described by much simpler mathematical formulas than the genes of the DNA molecule that give life. The formation of planets, stars, galaxies and their clusters occurred mainly under the influence of only one of the features of matter – gravity inherent in it [46]. This main “gene” of the Universe growth and development has fulfilled its important mission: it has gathered hydrogen into stars and ignited them, including the Sun; it has created black holes, which formed galaxies around them; it has gathered rocks and stardust into planets, including Earth (keeping the atmosphere, otherwise our planet would fly away into space), on which then life was born, perhaps, the only one in the vast Universe. The probability of its random occurrence is too infinitely small.

Industry is formed of its industrial “bricks”: units, mechanisms, equipment, various technological processes and materials, from which plants, power plants, roads and other industrial systems of countries, regions and the Earth’s technogenic civilization as a whole are then built. At the same time, all its industrial power (the terrestrial technosphere) by its intellectual potential as well as the intellectual potential of all people who lived on Earth and have been creating this technosphere for thousands of generations, as justified above, is very much inferior to the intellect of the Creator, who invented such a “simple brick” of any living organism (not life and biosphere as a whole) as a DNA molecule.



Each living cell of any living organism is millions of times more complex than DNA, and there are about 40 tln of them, for example, in the adult human body alone [47]. Cells have their own roads, bridges, power stations, plants, factories, slipways, machines, bio-reactors – about 50,000 complex biochemical (not simple chemical) reactions occur there at a time! All tissues, organs and systems of our body are made of these cells, which are of about 230 types: 850 muscles, 208 bones, 230 joints, 10 major systems, 78 organs, dozens of glands, billions of endocrine cells producing thousands of completely different secretions, hormones and biologically active organic substances that regulate the most complex biochemical reactions – metabolism in cells and organs.

In addition, the human body is endowed with the most complex internal transport system – more than 100 bln blood vessels alone with a total length of about 100,000 km with 25 tln “vehicles” [48], i.e., blood erythrocytes (if all erythrocytes are arranged in one line, close to each other, it will stretch for almost 200,000 km), and also has its own informational network – nerve fibers with a total length of about 150,000 km. At the same time, there is a huge number of all kinds of connections (for energy, information and products) both inside the organism and with the outside world, the exact number of which is unrealistic to calculate: it is likely to be more than a googol, and this number is unimaginably large.

By its engineering complexity, and the Creator was certainly an engineer (but in no way a banker, politician, economist, philosopher, priest or oligarch), the human organism is myriads of times more complex than everything that our engineering civilization has created in the history of its existence, and it is impossible to give a more precise value of this complexity than the abstract “myriads”.

Let us imagine a human lying in a coma. His body is functioning normally, his organs and systems are working properly, and the work of this hypercomplex creation is controlled by his own brain without anyone else’s help. Such a person does not have only consciousness. Can it be said that in such a state he possesses intelligence? Of course not.

People began to use the term “artificial intelligence” to refer to primitive systems for controlling technological processes, such as automobile, with the help of primitive machines – hardware computers, which are, in fact, fast calculators. Such “intelligence” has no consciousness, spirituality, worldview, morality, ethics, morals, culture and goal-setting. It is obvious that the ability to quickly calculate and manage any processes, both technological and vital, is not included in the concepts of “mind” and “intelligence”.

The main reason for the emergence of ideas that the digit should lead the individual, society and humanity as a whole is the desire of the “global elite” to obtain super profits with uncontrolled and irresponsible management of humanity, reduced to the level of digital biorobot-convergent, where each digitized humanoid creature will be just a faceless ant or a worker bee in a swarm.

From the engineering point of view, the attempt to create a “brave new world” of inclusive capitalism is no better than the idea of creating a world in which, for example, the flight of a primitive Boeing airplane will be controlled by an incredibly complex virus, such as COVID-19. The fact that the simplest virus made up by the Creator is incredibly more complicated than any most complex human-made machine, which is described in detail above, is evidenced at least by the fact that human can design airplanes, make them from scratch and then improve them, including inventing an autopilot to make them fly even better. But the virus – no, human is not able to design it from scratch, from atom to atom, he can only somehow modify a natural virus, completely unaware of the long-term consequences of such an engineering transformation.

Simple systems should be managed by more complex ones, and not vice versa, as it is planned to do in the virtual universe being created in the 21st century. Moreover, the managing system should be more complex than the controlled one by many orders of magnitude. For example, a mosquito, which is millions of times more complex than a virus or even a monkey, which is even more complex, will not be able to control an airplane. The “successes” of so-called artificial intelligence (all of them imaginary, not real)

are not due to the fact that it is supposedly very clever, but due to the fact that it is generated and accompanied by a creator – intellectual person, engineer. And not just one but a society, and not just the society of some single African tribe but of the entire Earth's technocratic (i.e., industrial) civilization.

It was civilization that gave everyone the main components of their personal intelligence – awareness, spirituality, morality, culture, goal-setting, the baggage of knowledge, including scientific knowledge, formed during thousands and thousands of generations of development of *Homo sapiens* and Earth's industry as a whole, which, in fact, made it possible to develop a fast computing digital machine. This means, a stillborn (because it is not alive), unintelligent and spiritless child of technological progress called artificial intelligence should in no way guide its creator – a human with real live intelligence. Otherwise, it will be like in the story with an airplane controlled by a virus, a mosquito or a monkey: after taking off, such an "intelligent" device will certainly crash. At least for the simple reason that even after learning to control the technology, the mosquito will not learn to use it expediently, for example, to refill it with fuel, which still has to be produced somewhere and then delivered to the airplane.

The essence of civilization, which is to establish an order parallel or alternative to the natural order, in the ultimate perspective can be realized in only three scenarios.

The first is the global oppression of all living things and their displacement (replacement) by artificial ones.

The second is the rejection of the civilizational (technological) path of development and a return to savagery, accompanied by the triumph of nature.

The third is the establishment of a balance between nature (animate and inanimate) and artificial forms of organization of matter and thought.

The latter scenario is possible only with a strict distinction between the technosphere and the biosphere, including segmentation of areas of application of digital and natural thinking. It is necessary that virtual reality technologies serve the actual (real) world, and not vice

versa, as they are now trying to position it as some kind of universal benefit from inclusive capitalism.

Engineering in projects related to artificial intelligence reaches its apotheosis and loses touch with reality. On the one hand, in the form of industry, it destroys it by polluting it with waste. On the other hand, it replaces reality with refined artificial constructs. Engineering is at war with nature, although it does not set itself such goals. It does not set goals at all but turns out to be only a tool for achieving them. The goals themselves are dictated by power, embodied in capital or systems of state repression. However, only engineering can and must become a goal-setting principle. Only engineering can save civilization and the world.

It is necessary to reject the continuation of existence in the format of technocratic civilization, which replaces the living with the dead. Civilization should become of an engineering nature, so that not technology but the living and the main thing in human – Mind – rules the world.

3. AXIOLOGY OF ENGINEERING

3.1. Why Only Engineers Can Save the World

Only engineers can save the world. They are the only ones who are able to lead humankind away from the false path of the so-called “elites” of the 21st century, which grew out of the same impostor and self-proclaimed “elites” of the previous centuries. Why false? Because they are contrary to life and nature.

The idea that the future of civilization rests only in a return to a state similar to primitiveness is unnatural and monstrous. Is it possible to presume that the best thing for humanity would be an artificial population decline, the replacement of humans with robots and artificial intelligence and the total control of conscious and physical life using digital and biochemical technologies? The above implies the utmost removal, a departure from all organic and natural to all artificial and manufactured. And if nature is the criterion of good (it is so, and I will tell you why) then the proposed course of action will lead to an absolute evil – satanism in its purest form.

Life and nature are the criteria of truth, goodness and beauty because they rise above everything and have no more significant definitions and certainties than those inherent in them. Of all the living things that are conceivable to us, it is humankind that brings something else into the world apart from nature. In Christianity, this is called free will. And this ability is not only to follow the laws of nature but also to use them for one’s own needs and even to oppose them, which is the cause of human’s evil, falsehood and ugliness. So, for example, killing a living creature is not itself evil if done by nature’s laws to obtain food. But murder committed by human for profit, power or perverse pleasure is malicious, false and ugly. In science, on the other hand, something corresponding to the natural structure

of the object under study will be the only true statement. In art, it is beautiful only if it reveals the nature of the thing portrayed. Finally, in engineering, the most efficient device is the one that makes the best use of natural energy and produces minor damage to nature.

If life and nature are absolute reference points for human, they must be the same for all humanity and civilization. From this perspective, we, like all life, must strive to grow, multiply numerically, develop physically and spiritually, occupy new territories, and humanely – without disturbing or destroying them. It is necessary to increase production, expand the industry, extract and process more and more, move faster and faster. The main thing here, in the industrial vector of development of our multibillion civilization, is not to clinch with the Live Nature, our home inhabited by life about 4 bln years ago, the Earth’s biosphere. Under the accepted thesis of nature as the criterion of truth, only this path is valid. But is it possible? Or have we exceeded the capacity of our planet? Or is it true that the only way for humans to follow nature is to turn against it? Perhaps to commit suicide? Or to destroy everything in creation? To limit and to emasculate ourselves? Does it turn out that humans generally represent some misunderstanding, a ridiculous mistake of nature, a dead-end branch of evolution?

Engineering has become a systemic element for modern civilization. The world is defined and controlled by technology invented and maintained by humans. This technology is killing all living things, including those who serve it. Who can make a difference? Only those who know how to manage, design and optimize technology.

Humanity cannot give up on industry. As Voltaire said, you can move backwards to nature, but then you will have to get on all fours. If we abandon the technogenic path of development, most of humanity will die out. Therefore, if we cannot give up industry and at the same time want to maintain suitable conditions for our survival, we must change the industry. This can only be done by the engineers who have created the industrial leviathan.

Using engineering means to eliminate the problems created by engineering, similar to the famous “Physician, heal thyself” – this is the existential challenge of the 21st century. Priorities must be set.

Of all the values, the highest one should be a reasonable arrangement of the environment. Because only this value in the 21st century can provide the conditions of preservation and growth for humanity.

Of all the strata and layers of society capable of claiming a decisive voice, only engineers can do so by right and circumstance. Politicians, regardless of their views and party affiliation, will always be concerned only with power. To do so, they must inevitably share everything – space, resources and influence on people’s minds. The more you have, the stronger your power, but you can never have everything until there is another power-seeker off the leash. If you are a financier, you are concerned about numbers and will soon pull away from reality. Precepting the world through financial relations is monstrous and murderous in its essence. Human lives and great nature turn into flows of values and quotations. The banker’s goal is profit. Nothing real is taken into account, and everything (even the planet) can be sacrificed for a good amount. How much is the planet?! Religion has lost the consolidating power it once possessed. Priests and clerics offer to seek salvation in another world, while this world, torn apart by politicians and financiers, is dying. Art is ephemeral, science is indifferent. Only engineers remain – servants of people, who, in order to save the latter, must become masters themselves.

3.2. Why Engineers Do Not Rule the World

The revolutionary engineering spirit changes the entire epochs when the rapid development of transportation, fuel and energy, metallurgy, machine-building, chemical, microelectronic, construction, agricultural and other industries begins. As for the inventors themselves, the managerial and commercial dimension is inherent in them to some extent, but in the realm of exact sciences they manifest themselves best.

Engineers seem to live in a world of their own, unconnected to the rest of the human Universe. They are driven by ideas. A few enthusiasts, faithful to the dream, unite around the idea. They occupy the simplest production facilities and develop into a full cycle

of manufacturing of various mechanisms, multikilometer conveyors, a continuous assembly line of cars in 10 s, combat aircraft in 1 h or corporations that have actual impact on geopolitics. Engineers are often at the origin of these organizations. It happens, being initially low-profile and underprivileged, they are at the origins of the entire industries. And then, almost always, engineers withdraw into the shadows.

The overall management of the sprawling technogenic giants is being handed over from the founding families to those who are more legally and commercially savvy and better informed about the global balance of power and political conjunctures. The engineering thought, stumbling over mass production, endless profit maximization and the ever-increasing drive for gain, returns to itself. It is from this secluded, rigorous intellectual world that engineers bring their fundamentally different and stunning ideas into the reality of the average person. First the ideas are met with rejection, then with a cautious acceptance and, finally, with universal admiration.

From Nikola Tesla’s diaries: “If I only think about it, I see the whole picture. I experienced it for the first time in 1882 in Budapest. During a walk in the park I suddenly showed myself the scheme of the engine working on alternating current. Even before I understood what was happening, I began to draw the diagram quickly with a cane on the sand because until that day it was not my habit to always carry notebooks and pencil” [49].

The government has always sought to put these unique people – engineers, inventors, scientists – at its service in order to ensure advantages and more favorable positions in the competitive race for supremacy among other powers. Not really going into the essence of research and depth of engineering studies, those in power were mainly interested in the practical significance of discoveries and inventions. And there is no contradiction here as one cannot serve two masters: either an engineer is absorbed in discovery and cognition of regularities existing in nature, creation of new forms of things and processes, construction of devices that can help in more perfect exploration of the world, or he strives to accumulate power, participates in the struggle for leadership and domination, strives to consolidate power, protects it and serves its achievement.

Igor Kurchatov, the originator of the Soviet atomic project, headed a special laboratory in 1943 under a secret order from Joseph Stalin "On Organization of Work on Uranium". Colleagues spoke of the scientist as a talented and vigorous organizer of engineering work, who at the same time was independently responsible for solving complex scientific problems. Associates of the legendary physicist were officials and managers who were responsible for the urgent execution of industrial orders, construction of enterprises, development of mining and processing of uranium ores and coordination of various endeavors. Kurchatov himself was on the cutting edge of solving the problem, which completely absorbed him, so sometimes he could be on duty in the reactor hall, risking a lethal dose of radiation. This Soviet scientist was the passionate creator of the world's first atomic reactors and power plants. And it would be pointless to try to imagine him involved in an internal party struggle for power or agitating in favor of universal equality, freedom and fraternity, while subduing the undesirable and disobedient by waves of mass repression on the way to the establishment of a totalitarian society.

The government is always interested in using people of science and engineers to protect and strengthen its influence and power. Therefore, the power encourages or neutralizes such people depending on what it needs at a particular historical moment. For his exceptional services in solving the problem of atomic energy use, Kurchatov was awarded honorary titles, rewarded with 500,000 Soviet rubles and received a car as a gift.

Another example of the extreme interest of the government in engineering discoveries in rocket science took place immediately after the Great Patriotic War. At that time, US intelligence exported German scientists of Hitler's Germany to their country. The authorities in America were not at all embarrassed that the father of the so-called American space program was a member of the Nazi Party, SS-Sturmbannführer Werner von Braun. He and other German scientists were given new biographies as part of Operation Paperclip, which made no mention of membership in the Nazi Party. This is how the US "laundered" the scientists it needed from Nazism and gave them

the opportunity to live and work in peace for the good of America. It is known that forced labor of concentration camp inmates was used in the construction of rockets and many people died. They were outnumbered by those who suffered from the use of the rocket itself as a weapon. However, von Braun and other "useful" people were not prosecuted and did not end up at the Nuremberg trials. Thus, in the last century, the USSR became the power to build the first nuclear power plant, and the United States became the country to construct the first nuclear bomb...

In the 21st century, engineers continue to play a crucial role in the development of civilization. It is not only about supporting and utilizing everything created for the benefit of humankind but also about the unceasing development of new technologies. The status and remuneration of engineering competencies today vary depending on the specialization. According to the Bureau of Labor Statistics report in 2019, the average salary for engineers in the USA was 94,000 USD per year, with the highest paid engineers making over 150,000 USD per year. In Germany, which is one of the most recognized leaders in engineering and has a high salary level for engineers, it's an average of 65,000 USD per year. In China, engineering is developing rapidly. Many foreign companies invest and develop their projects with a focus on China, which leads to a high demand for specialists in various fields. The Hays Asia Salary Guide report says that engineers in China can earn more than 30,000 USD per year. In India it's about 10,000 USD per year. Despite this disparity and, in some cases, impressive sums, the pay available to engineers is not comparable to that of stock speculators, arms and resource dealers, politicians and directors of multinational companies.

We see engineers being used as support staff to create and arrange the material world for the global purposes of the government or to work for private capital. Then why don't engineers run the world? After all, the world is created, maintained and developed by them. With the technological advancement, the need for and dependence on technically literate people around the world is only increasing. Instead, we observe the processes of engineers' enslavement, their distribution into industry segments and farms for the purpose of exploitation.

It turns out that the inspirers and inventors of the world have to fight for their rights, defend acceptable working conditions and achieve the simplest and necessary for life benefits, while the beneficiaries are the holders of power and capital. It is they who decide the distribution of benefits, establish convenient laws and exceptions and are much more concerned only with their financial interests.

No matter how unjust the world may be, and no matter how many waves of indignation of the oppressed against their oppressors may rise from time to time, the world still ends up with a pattern in which, under various, more or less beautiful wrappings, the absolute majority is exploited by the minority and legalized methods of theft are practiced. In the 19th century, the proletariat of the USA and European countries made every effort to reduce the working day to 8 h. In some industries, those working in difficult conditions, for example underground, were able to get at least a relative amount of rest. However, in disputes over the possibility of regulating the length of the working day, judicial practice was mainly on the side of businessmen. Over the course of a century, it took many mass worker protests to change this situation. At all times, the beneficiaries have been reluctant to make concessions and certainly never willing to share power. Unfortunately, history knows of no examples of a complete voluntary transfer of power to engineers.

We can conclude that engineering, like any creative thought, is a self-sustaining passion. It is in itself so significant and fascinating that it can overshadow the rest of the world. And no matter what happens, no matter how low engineering labor is evaluated, nevertheless, being a vocation, it creates internal laws and meanings by which a creative person lives. In this respect, it is much more honest, stable and predictable than the world, in which a ruthless struggle for power has been going on for millennia. The latter is precisely the desire to rule the world, and in this race from ancient times people of various professions have participated, who were not always the best but always had great ambitions. The qualities necessary for this struggle can be combined with engineering genius, but sooner or later everyone has to choose one thing and give an answer to the question: "Who were you: an engineer, a businessman or a politician?"

Because one passion will always be overcome by another, stronger and more exciting one. Unfortunately, engineering as a passion (as well as the struggle for power) is itself devoid of moral implications and is therefore simply an act of will.

3.3. Government Against Engineers

Engineers are often unwanted. There are reports that at the time of Russian tsar Ivan the Terrible, there was a human who invented wings. A peasant named Nikita built a flying machine out of wood and leather. He climbed the bell tower and flew over the fortress called Alexander Sloboda. The flights were reported to the tsar, who ordered: "Man is no bird, he has no wings. But if he gives himself wooden wings – he acts against nature... For this friendship with the evil, cut off the inventor's head... And this invention, as if created with the devil's help, after the Divine Liturgy shall burn" [50]. However, when the same ruler's engineers laid a charge under the walls of an enemy citadel or armed an elite army of shooters with rifles and cannons to kill, it was considered normal, not abominable.

Until the 18th century, the profession of engineer correlated exclusively with military equipment such as weapons, defensive and siege structures. The government never had much need to optimize peaceful life with technology. The fact that the scientific and technological revolution once took place is the result of the engineers' revolt. No one called on them, no one invited them to change the world. They did it out of their own initiative, against all obstacles and risks to their lives.

In many cases, the government simply does not hear engineers. Even the founder of genetic engineering, Gregor Mendel, did not find a response to his invention. His report, which described the key laws for the future Green Revolution, aroused neither interest nor discussion. His experiments in plant hybridization and mouse crossbreeding went unnoticed. He ended up spending his old age as a beekeeper. In the 1860s, people were interested in steam engines, not peas. The constant famine in Europe and its colonies, which was causing

many deaths, was of no concern to anyone. Money was made on other things. It was only half a century later, when the inertia of the industrial revolution went down and the world approached the global crisis of World War I, that Mendel's discoveries were given the green light. However, even then it was not without incidents.

In the 1930s, when genetics was developing all over the world, the Soviet authorities decided to overtake the whole world and, like gamblers, bet everything on a technology that, according to the authors' unproven assurances, made it possible to increase yields fivefold in the shortest possible time, without years of work on breeding new varieties. Engineers who dared to go against the party line were repressed. Among them was the outstanding genetic engineer Nikolai Vavilov.

In the case of Vavilov, the government appeared to have good intentions. In reality they were concerned with their own power and enrichment. By this time, agricultural products should have become one of the main export items. But this could not be achieved, although it was very much desired. To judge how strong this desire was, you can look at the experience of 1930, when suddenly the volume of grain sales abroad exceeded five times the figure of the previous 1929. It turned out that this product was simply confiscated from the peasants, which was one of the causes of mass famine, including in Ukraine in 1932–1933. The authorities needed a quick result, no matter what the cost, including human lives.

Ultimately, the political pressure on agricultural engineers in the 1930s cost the USSR biotechnology lagged far behind Europe. The government gained excessive control over engineering, essentially officially reducing all work on the technical improvement of the economy to the activities of state institutions. As soon as the power became absolute, it demonstrated its primitive animal nature, chasing, as they say in Russia, the short ruble.

If power is distributed through the capitalist system, engineering is counteracted through the subjects of economic relations, not directly, as in the example of the USSR. At different times, professional estates, large landowners or owners of industries have stood in the way of progress.



An important invention (along with the steam engine), which marked the beginning of the industrial revolution, was a newly designed mechanical spinning device. It was created by the Englishman James Hargreaves in 1765 and was called the “Spinning Jenny”, after either his wife or one of his daughters. The compact and relatively affordable machine was six times more productive than available alternatives. At the same time, it required one person to run the “Jenny”. This meant that at least five spinners were out of a job. The innovation caused a great deal of resentment. Hargreaves had only managed to build and sell a handful of machines when his house and its equipment were burned to the ground in an armed raid. This case is probably the first in history to show how competition encouraged going to war against new technology.

When George Stephenson made his first trials, he had to hire huge boxers to walk in front of the locomotive and fend off farmers armed with pitchforks who were intent on tearing the “fire-breathing beast” to pieces. When the first commercial interurban line was built between Stockton and Darlington, landowners began to resist the innovation – their reaction was immediate. When the project was first considered in Parliament, Lord Darlington objected, not liking the fact that the route would pass through his lands, where the aristocrat liked to hunt foxes. After some debate and the hunter’s use of high-level connections, the construction proposal was rejected. The authors of the project had to modify it to bypass Darlington’s lands, and the railroad was built. For nearly another decade, however, the new transportation systems would not be embraced by the owners of the land over which the rails were to be laid. Protesters drafted collective letters to authorities, collected signatures, etc. They argued, for example, that because of the noise and smoke, cows would stop giving milk, trees would stop bearing fruit, chickens would stop laying eggs, houses along the roads would burn down and inns would be ruined. As can be seen, the arguments were purely economic.

In addition to landowners, shipping and canal companies were also dissatisfied. On the Manchester – Liverpool route, where Stephenson laid the first commercially viable railroad in history, the canals had long been the main thoroughfares. Naturally, road trusts and stagecoach

owners also became agitated. Accordingly, problems arose from the very beginning of construction. Surveyors were attacked with stones, pitchforks and other weapons. Real battles broke out, during which the attackers tried to take the theodolites as spoils of war. Again (this time to protect the equipment) Stephenson had to enlist the help of a professional boxer, a local champion. Sometimes the surveyors were forced to work exclusively at night, while the men of one of the co-owners of the canals named Bradshaw, who was also a landowner in the area of interest to the railroaders, randomly fired guns in different directions. In addition, Bradshaw distributed leaflets depicting the horrors of laying the rails. But in spite of everything, the job was done [51].

Very soon the British were convinced of the efficiency of the new technology. The shareholders of the road received up to 10 % dividends annually. Landowners gradually realized the inevitability of progress and the possibility of receiving serious compensation for the use of their property. The amount could be the greater, the less resistance from their side, and consequently, the lower the costs of the railroad company. Since the most significant compensation was paid to those whose houses stood on the track, there were cases of hastily erecting something resembling a dwelling there.

Not only landowners but also doctors were against the innovations. In 1837, the Bavarian Royal Medical Council gave the following conclusion: “The construction of railroads would be detrimental to public health. It is obvious that the rapid movement (at a speed of 41 km/h) must cause brain disease, a kind of raving insanity, in the passengers. Since it is also obvious that there will be people who are not frightened by this terrible danger, the state is obliged to protect at least the spectators, for the sight of a fast-moving car can cause a similar disease in them as well” [52]. In the same vein, French journalists described the consequences of travel, claiming that a human who got off the train, “saturated with speed”, would continue to run until he hits some obstacle and his head would split open like a watermelon.

With the resistance that the railroaders faced, every slightest blunder of the engineers and builders went in favor of the opposition.



Accidents and disasters were constantly recorded. During the commissioning of the same first line from Manchester to Liverpool, there was a tragedy. When the locomotive “Rocket” built by Stephenson stopped for refueling with water, MP William Huskisson got off the train to look around. The train moved off. The parliamentarian panicked and found himself under the wheels. Naturally, this was seen as a bad omen. Over the next few years, people unaccustomed to the new threat continued to die on crossings and overpasses, adding fuel to the fire of public outrage. The Household Narrative, an English newspaper, even had a special section devoted to accidents involving steam locomotives. However, the convenience and speed of transportation that the new technology provided to people proved to be a more powerful argument than all the losses incurred by the ruling class of capitalists. The railroad spread its network and soon its owners became the bosses who did not want to give up the throne to anyone. And just like their predecessors, they were ready to do anything, right up to a murder.

The first patent for an internal combustion engine was issued to Frenchman Philippe Lebon in 1801. The engine was powered by luminous gas produced by burning coal in an airless space. The inventor did not have time to build a prototype. The drawings were ready, and work had already begun, but in 1804 Lebon was killed under mysterious circumstances. Unknown people attacked him on the way to Napoleon’s coronation ceremony and stabbed him 10 times. Behind this crime contemporaries saw traces of railroaders. Nevertheless, the advent of automobiles was inevitable. And just as in the case of the railroad, the onset of this inevitability was associated with great resistance of power and business embodied in the representatives of the ruling classes.

Automakers and their shareholders had to overcome the lobby of horse and stagecoach owners as well as manufacturers and sellers of wagons, harnesses, fodder and others. For example, an English poster from 1908 denouncing “reckless motorists” who “kill your children”, dogs and chickens, “fill your house with dust” and “spoil your clothes”, causing the loss of 100,000 jobs in industries related to carriage transportation [53]. Neither these nor all other objections

and protests could stop the spread of cars. By 1929, thanks to Henry Ford and his car, the Model T, available to the middle class, almost every family in the United States owned a newfangled vehicle. There were 20 cars for every 100 people. Gradually, other countries were doing the same. In 2020, there were almost 1.5 bln of these horseless carriages on the planet.

All these cases show how engineers paved the way for their peaceful inventions through misunderstanding and persecution. Only military discoveries have always been successful. With the support of the authorities, engineers came up with ever more sophisticated instruments of murder and plunder. Engineers served the world by facilitating crime. Engineers changed the world for the better through rebellion against the system. The system then adjusted to them by changing. In the reality of the 21st century, a new rebellion must happen. An uprising of engineers.

3.4. Discovering the Power of Technology

As you can see, engineering and technology in the past occupied a modest place on the stage of civilization. History was made and dynasties were created, while weapons and tools of labor are only tools for achieving such goals. They have no effect on anything in themselves. They can be treated neutrally or even neglected. The situation was slowly changing. Machines were taking over the world and beginning to dictate the rules. But the inertia in thinking about them persisted for a long time.

The neutrality of technology was taken for granted in the 20th century. The underestimation of technology led to the largest wars, in which technology appeared as a global meat grinder that crushed tens of millions of human bodies. But there were those who understood, those who foresaw the catastrophe, and those who realized its causes when it was too late to change anything. Martin Heidegger wrote: "...We are delivered over to it [technology] in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology.

...The revealing that rules in modern technology is a challenging, which puts to nature the unreasonable demand that it supply energy that can be extracted and stored as such. But does this not hold true for the old windmill as well? No. Its sails do indeed turn in the wind; they are left entirely to the wind's blowing. But the windmill does not unlock energy from the air currents in order to store it" [54].

According to Heidegger, technology, having become the social anchoring element, determines entirely how the humans view the world. And as long as it is perceived only instrumentally, our world has no chance of self-preservation. Technology in such a context grinds up the natural and mental masses in order to ensure its existence. It becomes an end in itself. Technology thus gives dimension to everything. And makes everything neutral and lifeless. These are the consequences of the moral neutrality of technology and engineering.

Others have also spoken of the importance of giving technology a moral dimension. For example, Nikolai Berdyaev noted that "the development of practical science was for him [Karl Marx] merely a subordinate function of social processes.

Our moral attitude towards technical achievements presents an important problem, worked out but little as yet. It has a significance for the world as a whole. The ethics of creativeness must admit that the progress of practical science has positive value and is a manifestation of human's free spirit and of his creative vocation in the world. But at the same time it must clearly recognize that such progress brings with it the greatest danger of new slavery and degradation for the human spirit. We must be keenly sensitive to this and rise above a neutral attitude to scientific progress. It is wrong and unspiritual to oppose to the new world discovered by science the old primeval "earth" and "nature" to which human ought to remain subordinated. The "earth" is a religious symbol but it may be understood materialistically. And it must be recognized that science, destroying as it does many illusions born of weakness and dependence, may help us to overcome religious materialism and attain greater spirituality, though, on the other hand, it threatens to materialize life through and through. The achievements of practical

science put the human spirit to the test and bring out its essential qualities. The right attitude towards scientific progress inevitably presupposes a spiritual asceticism and control of the lust of life to which science is always ready to pander. Practical science has an eschatology of its own, opposed to the Christian, and its goal is to conquer the world and to organize life without God and apart from a spiritual regeneration of mankind" [55].

"One of the consequences of scientific progress is that everything which had appeared as neutral acquires a spiritual and religious significance. Technical achievements are morally neutral up to a point. When they reach a certain level they lose this neutral character and may turn into black magic if the human spirit does not subordinate them to a higher purpose. Scientific and technical progress may eventually lead to the destruction of the greater portion of mankind and even to a cosmic catastrophe. The moral and spiritual condition of man, who has acquired an unheard of power over nature, becomes of paramount importance. Nature was at first full of gods, then it was regarded as a dark power and finally, in modern times, it has been completely neutralized. But the progress of practical science confronts man with a new nature which can no longer be considered neutral" [55].

Both authors saw in technology not only a threat but also an opportunity to save the world. To do so, it must serve some kind of higher value, and not just supply products to the consumer society. By serving values, technology itself becomes a value, just as one who climbs a mountain becomes a summit for others. However, technology is the embodiment of engineering and the result of the engineer's labor. Therefore, it should not be a value and reference on its own but as engineering. In addition to the value dimension, engineering is given the function of a goal-setting principle. The coincidence of value, purpose and instrument is only possible in engineering. This is the basis of its power, which cannot and should not be interpreted as the power of technology, as traditional technocrats try to suggest. It should be the domination of the living human principle, embodying rationality and reason – engineerocracy, which includes both engineering, social and humanitarian components.

3.5. Essence of Engineering and Engineer

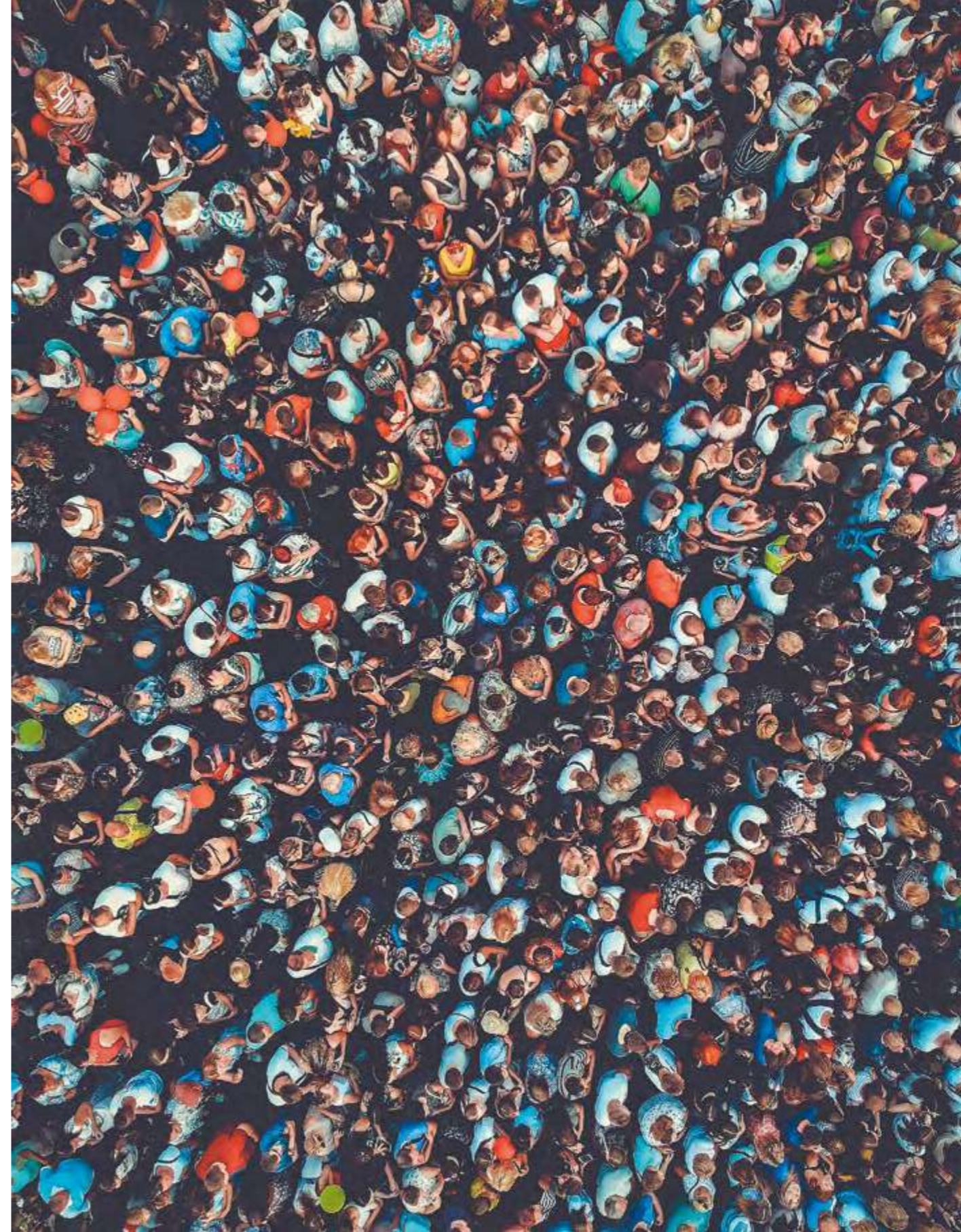
The monkey picked up a stick and became the human. The human attached a stone to the stick and became an engineer. The essence of a creature's transition from the animal state to the rational state is that something else appears between the action and the object in relation to which this action is performed. At first it is an object, then the images of objects, the language and, finally, abstract concepts. At some stage of development, the sequence begins to work in the opposite direction, from concepts to objects. Through the concepts, goals are set, which are particularized in the language of mathematics, in order to combine the objects in an expedient way and to influence the object by means of the resulting mechanism or device.

Engineering is a type of supreme creativity as a human activity to transform the material reality surrounding everyone. The goals of engineering are always clearly defined and focused on achieving a practically measurable result, and the means are limited by available experience, knowledge, the requirement to minimize resources and efforts while maximizing efficiency as well as the laws of the physical world around us, laid down by the Creator initially, at the time of the Creation of the Universe.

Here is an example from the era of primitive technology: a river prevents a group of people from freely crossing to the opposite bank, which people have concepts about. There is a forest there, which means there may be game. It can be caught and eaten. For the crossing, you need an object that can hold on to the water itself and support a passenger. Logs float well. It's uncomfortable on one. Therefore, it is better to connect several of them with something like a rope and get something like a raft. In such concepts a person defines a goal and a possible algorithm of its achievement. Then he starts to count by using the language of primitive mathematics. What number of logs will be optimal? How many stems will it take to weave the ropes? What is the approximate length of the ropes? Having calculated, engineer begins to act to create the device necessary to accomplish the goal. Based on concepts and calculations, he combines preexisting objects in ways they have never been combined before.

Reflecting on technology, Oswald Spengler wrote: "...Soul strides forward in an ever-increasing alienation from all Nature. The weapons of the beasts of prey are natural, but the armed fist of man with its artificially made, thought-out, and selected weapon is not. Here begins "Art" as a counter-concept to "Nature". Every technical process of man is an art and is always so described – so, for instance, archery and equitation, the art of war, the arts of building and government, of sacrificing and prophesying, of painting and versification, of scientific experiment. Every work of man is artificial, unnatural, from the lighting of a fire to the achievements that are specifically designated as "artistic" in the high Cultures. The privilege of creation has been wrested from Nature. "Free will" itself is an act of rebellion and nothing less. Creative man has stepped outside the bounds of Nature, and with every fresh creation he departs further and further from her, becomes more and more her enemy. That is his "world-history", the history of a steadily increasing, fateful rift between man's world and the Universe – the history of a rebel that grows up to raise his hand against his mother" [56].

Engineering is the highest form of creativity, and its result is the most intellectually rich form of art. Just as an artist takes paints and draws a picture, and a writer composes a novel from words, an engineer, putting together constructive and technological elements created by previous engineering and science, gets a result that is not equal to the sum of these parts. There is always a synergy here. Taken together, such parts become an engineering work of art with a new quality. In our example, something fundamentally different has been created from logs and stems – a simple floating vehicle. The difference between engineering creativity and artistic creativity is that it is always aimed at practical results. Art, on the other hand, creates the beautiful, the sense of which, as Immanuel Kant puts it, is the notion of rationality without the notion of purpose. The goal of engineering, on the contrary, must always be clearly defined, tangible and have a roadmap, often involving teams of thousands and investing millions of human-days of engineering labor. Can an opera, a ballet or a painting by an artist be compared to the creativity and complexity of the intellectual labor invested, for example, in the creation of a spaceship or a nuclear power plant?



The situation in which an engineer is a servant causes a series of consequences that are destructive both for engineer and for civilization. As one's work can be guided not by one's own but by the interests of others, responsibility is diluted or washed away altogether. "I have made a sword, and whether it will be used to defend the Fatherland or to kill a baby is the moral choice of the one who takes the sword in his hands." This example can be found in Heraclitus, a philosopher who lived in the 500s B.C. and is considered the founder of dialectics. To simplify, his teachings can be reduced to the formula "everything is relative", which has been the basis of world management for centuries. It has always been believed that good for one nation can be evil for another, that the truth of some social groups can be a lie for others. So, it is possible to lie, betray, kill, etc. This is what politics is based on at all times. Another Renaissance thinker Niccolò Machiavelli formulated such a principle even more succinctly: "The end justifies the means." However, is such a position acceptable for an engineer, if we consider him or her not as a person who has acquired certain skills within his or her profession but as a matter?

If only the goal is clearly defined, the means to achieve it are quite specific and limited, which is rarely the case with political or economic goals. Power has no clear outlines, just as monetary wealth has no clear limits of reasonableness and sufficiency. If a society exists for the sake of increasing its power, then all means are good. If it exists to increase wealth, it's the same story. But to get to the other bank of the river, there are only a limited number of possibilities, from wading or swimming to building a catapult or a bridge. Moreover, if we remove the first two methods as nonengineering, the choice of options gets even smaller, although still quite big.

From an engineering point of view, the choice should be made in favor of the most efficient solution. It is absurd to carry stones a hundred kilometers away to build a crossing when there are trees all around. It is foolish to build bulky supports and spans when a small raft is sufficient to achieve the same results. Besides the engineer's goal is always clear, it should be achieved in the most efficient possible way. Politics, like an art, needs not be efficient in means.

Not only its objective but the means themselves and the effect their application will produce can often be difficult to predict. An artist can draw a square ball or a black square and be recognized as a genius. If an engineer comes up with a car with square wheels, he is likely to be recognized as a madman.

Specificity of goal-setting and requirements to minimize the means of achieving the goal make the formula "the end justifies the means" inapplicable to engineering activity. It is ridiculous to assert, for example, that motion justifies a wheel or that the possibility of speed and automation of mathematical calculations justifies microchips. In general, the concept of justification, whether legal or moral, cannot be applied to technical developments taken as such. Engineering stands beyond good and evil. It helps to solve specific problems as efficiently as possible. It can be assumed that if the tasks were set within engineering, rather than coming from outside as a directive, the nature of the goals driving civilization could change, and the means used would not need to be justified.

For clarity, consider the structure of goal-setting for the same situation from three perspectives: politics, economics and engineering. Let us return to our primitive community living on the river bank. Last season was not the best. Poor harvest, few mushrooms and berries, hunting misfortunes. The coming winter promises famine. What would the politics do? It would suggest we go on a campaign to kill and rob our neighbors. What could economics do? It could organize trade with a neighboring tribe, trading hides and tools for food. And what would be the solution in terms of engineering? To optimize the consumption, develop and implement the improved methods of food storage, insulate dwellings, create devices for hunting and fishing in winter – skis and snowshoes, artificial ponds for fishing, etc. All three options would potentially allow the tribe to survive. But in the first case, someone would have died. In the second case, the tribe would be deprived of valuable things, and instead would receive resources that would be consumed and disappear irretrievably. Only the third approach could ensure the preservation of what is available, at the same time increasing people's security and creating prerequisites for improving their quality of life in the future.

However, both in ancient times and today it is very rare to choose an engineering way of action in a critical situation. Our disunity and the value neutrality of engineering are the determinants.

The underlying value in the case study is survival. In order to live, the community is willing to sacrifice some of its members or wealth. At the same time, the community is not ready for creativity, which achieves better results than all other solutions. Why? Because already at the level of primitive instincts life can be perceived as domination. Life is about winning. To live is to be willing to kill or die. To live to the fullest is to consume as much as possible. All of these arguments are so natural. That is why they work perfectly well in political technology, propaganda and advertising. Against this background, the following statements sound too weak: life is creativity; to live, one must invent; to live fully means to consume as efficiently as possible. However, abovementioned theses are about the creative approach. The first ones are not. The conclusion is simple and bleak. Primitive, almost animal factors of the psyche are more often determinant in the choices made by human and humankind. The mind serves the will. That is a fact. And the way engineering is valued in the modern world follows directly from this. Engineers are servants.

In order not just to change the world but to ensure its harmonious development, it is important for engineering to get over its value neutrality. It is necessary to take engineering out of the position on the other side of good and evil, which can be done only by giving it moral dimension, by conceptualizing and positioning engineering as a good. Such a revaluation opens great prospects for positive transformation in virtually all areas of civilization. And such a revaluation is possible.

Civilization established the will as the supreme value. Similarly, before that, faith was the supreme value. Even earlier, at primitive levels of history, survival was the priority. It was pursued either through faith or will; it was embodied first in the pursuit of titles and ranks and then simply in the pursuit of money and power, without any symbolic fixation. Symbolic fixation is necessary in the religious dimension of civilization, in which the symbol acts as an intermediary

between the earthly and the divine. Christianity is built around the Nicene Creed¹. The post-feudal world replaces symbolic fixation with embodiment. Meaningfulness moves entirely into the space of the tangible, the corporeal. Symbols lose their stability because the scientific and technological revolution accelerates the whole system so that its fixation becomes impossible. This is the reason for the transition of civilization to the establishment of will as the supreme value. At a certain stage of development of our engineering civilization, it is mind and engineering (as its embodiment) that can take the place of the supreme value.

3.6. Revaluation in Technogenic Epoch

Everyone becomes an individual only in society, and their humanity depends not so much on their personal scale of values as on the society itself, in which they were born, raised and educated, having absorbed fundamental values. Undoubtedly including the following: both values and life goals, for example, those of Mowgli, fed by wolves,

¹The Nicene Creed is a statement that contains all the basic dogmas of the Orthodox Church. The doctrine is set forth in the Nicene Creed in a concise but precise form; it was compiled in the 4th century by the Fathers of the First and Second Ecumenical Councils. It consists of 12 statements: 1. I believe in one God, the Father almighty, maker of heaven and earth, of all things visible and invisible. 2. I believe in one Lord Jesus Christ, the Only Begotten Son of God, born of the Father before all ages. God from God, Light from Light, true God from true God, begotten, not made, consubstantial with the Father; through him all things were made. 3. Who for us men and for our salvation came down from Heaven, and was incarnate of the Holy Spirit and the Virgin Mary, and became man. 4. For our sake he was crucified under Pontius Pilate, he suffered death and was buried. 5. And rose again on the third day in accordance with the Scriptures. 6. He ascended into heaven and is seated at the right hand of the Father. 7. He will come again in glory to judge the living and the dead and his kingdom will have no end. 8. I believe in the Holy Spirit, the Lord, the giver of life, who proceeds from the Father [and the Son], who with the Father and the Son is adored and glorified, who has spoken through the prophets. 9. I believe in one, holy, catholic and apostolic Church. 10. I confess one Baptism for the forgiveness of sins. 11. I look forward to the resurrection of the dead. 12. And the life of the world to come. Amen [57].

or Indians, raised by a tribe, or Europeans, whose origins sprang in Ancient Greece and Ancient Rome, Russians, who had their roots in paganism, will be completely disparate.

Since the values and goals of each society are different, the problems that arise during their implementation will also be radically different. That is why the proposed solutions for achieving the set goals cannot be the same – they are often opposite and even antagonistic. This means that the logical chain being built “basic values – set goals – emerging problems – optimal solutions proposed to settle problems” will have a completely different orientation, boundaries of implementation and time length, depending on a particular society.

Since our Earth’s technogenic civilization as a whole (as a combination of all societies, as a mega-society consisting currently of 8 bln individuals living in 195 independent states, nine states with an uncertain status, 38 dependent territories, three territories with a special status, 16 territories without permanent population, 22 territories of states considered an integral part of them, but belonging to another part of the world, and two territories disputed by several states) is at the top of all social structures of humankind, then by itself it should become the greatest value for every person. At the same time, the general civilizational values of this mega-society should be only biospheric, since our civilization was born, grew up and turned out to be “registered” with billions of other species of living beings in our common house (or rather, in a large room that has no windows, doors or even partitions) – in the biosphere of planet Earth.

Ultimately, the issue of the humankind’s survival, which has arisen against the background of global environmental problems characteristic of our time, is an issue of certain values that drive us all. At the same time, the technological equipment of a civilization functioning on the planet as a global multibillion-faced technology consumer will play an incomparably smaller role than the intangible civilizational components – social, moral, ideological and spiritual aspects. No technical devices or ideas aimed at rationalizing people’s lives, protection of the environment and well-being will be implemented if there are no corresponding socio-spiritual values in the society.

On the other hand, the appearance of certain values is due to the specifics of the relations between people into which they enter during the production, exchange, distribution and consumption of the social product. However, this does not make the role and importance of values in the life of society any less. Yes, a change in technical equipment can contribute to a change in values. Yes, values are secondary, but they are what ultimately make humanity change. Even this approach recognizes the overriding role of values in the processes of social transformation.

Value is something indicating “the human, social and cultural significance of certain objects and phenomena, referring to the world of the proper, the target, the meaningful basis, the Absolute. Values set one of the possible ultimate limits of human sociocultural activity” [58]. Based on this, we can say: it is values that will determine the nature and direction of society and culture in the future, just as they did in the past.

By the 21st century, the world has survived a number of value crises. The most general view gives the following picture. First, the denial of the values of traditional cultures based on religion. Then there is the denial of the values of technological progress due to disappointment in the consequences to which this progress has led. Next – the rejection of values offered as part of three ideologies of the 20th century and their corresponding systems: nationalism (including fascism), socialism (including communism), capitalism in various versions of its existence. At the same time, in reality, the latter model (capitalist) still retains its position and dominates the world. However, it is experiencing a prolonged depression, primarily noticeable on the leveling of the inherent value system in capitalism.

Initiative, entrepreneurship, success, wealth, competition, free market – all this began to look very dubious against the background of environmental and social problems that result from the behavioral mindsets arising from this. But in reality, humanity is yet unable to generate anything fundamentally different, equally massive and attractive. As a result, the value structure of civilization, its sociosphere, acquires a relative character. There appear all kinds of surrogates and mixes that combine elements of political, religious,

scientific and ideological doctrines. Everything is presented as relative, situational, acquiring meaning only in the context of a particular discourse.

The society finds itself deprived of values other than those that relate to the lowest material level of consumption. "I am what I have" [59]. This is how Erich Fromm, author of the term "consumer society", described the current situation. In fact, such a society is inert, since it does not have a goal set by the values that the majority shares. So, it doesn't have a future either. The people in it, as Fromm noted, are just "eternal suckling crying for the bottle" [59].

The things that today's degrading capitalist liberal world offers to replace values, and specifically inclusivity, confirms the above. The relativity of all values is put forward for the role of the highest value. Consequently, the requirements of tolerance and equality in all forms of its manifestation become determining for the development of society. Thus, equality is indicated between the guiding principles of opposing ideological doctrines, religions, social and gender groups, cultures, traditions, i.e., the nature of what is happening corresponds to the formula "everything equals everything". Obviously, such mindsets cannot act as "the ultimate limits of sociocultural activity" [27]. The horizon of the activity they set and the goals they dictate will, in fact, be focused on nothing more than preserving the status quo. No orientation, no transformations, no qualitative development is possible here – constructive, creative, interactive, coevolutionary – because humanity should not only change nature but is also obliged to change itself, adapting to this nature.

Against the background of environmental, political, social, spiritual and other problems, on the solution of which the survival of humans as a species depends, the values of the 21st century (more precisely, anti-values, since they devalue everything) resemble a sleepwalker, completely disconnected from life. Suddenly waking up (which sooner or later happens), they do not understand the situation they are in. Or, without waking up, they die, falling into the abyss, never realizing at the moment of their fall what really happened to them.

Yes, it can be stated with sufficient reason that in this universal relativity, as in the point of view on the world, the attitude to nature

is also being revised. The ideas of equality of all species of living beings are postulated, an ecological imperative is established, setting the creation of a carbon neutrality economy (net zero) as a goal. However, all this is nothing more than a call to achieve the most stable state of the capitalist system and the society of material consumption but not civilization as a whole. At the same time, such a system of universal consumption, which has recently taken a tilt in the direction of virtual emotional consumption, including through the step-by-step transformation of a biological person into a digital cyborg, is initially imperfect in its fundamental parameters. Thus, the possibility of achieving the desired stability is highly questionable. And in general, such concepts as "value", "goal", "achievement", "problem", "solution", cease to be adequate to the situation. The words "business plan", "task", "execution", "optimization" become more appropriate here.

The values of society should not only provide conditions for preservation, they are also needed as a horizon of growth. If this is not the case, then we are no longer talking about "value" but about "cost", which, apparently, is inherently closer for capitalism and inclusive capitalism advancing on humanity. In order to explain what has been said, it is necessary to look even deeper into the history of the issue.

For Antiquity and the Middle Ages, this topic was incurious. At that time, people's worldview was made up in the system of religious coordinates, focusing on the corresponding goals, priorities and prospects. Values are something else. People start thinking about them when the medieval traditional culture dies out. It can be claimed that the problem of values arises in a situation of devaluation of former values and their reassessment. This process was deconstructed by Friedrich Nietzsche. Let us look at it.

The value according to the Nietzsche's assessment is the point of view, i.e., the point at which the eye of the beholder is located and from which his attitude to the world is projected. At the same time, the value as a point of view always means a condition of preservation and growth [60]. It has a dual character because of the life's nature itself, where the value should be a part of it. Nietzsche defined

this essence as the will to power, which drives everything in the world, including human. If this will weakens, if the value does not reflect its dual essence and does not allow the power to surpass itself at every moment, to grow, then the being led by such values begins inevitably to degrade and rushes to its death.

Despite the apparent complexity of such a mental construction, its meaning is simple and clear. The thing that ceases to grow and develop dies.

The described process is already happening in the 21st century in liberal culture with its pseudo-values that make everything relative, thereby depriving society of even the possibility of choosing the direction of development. Everything happens as in the situation when you need to get to a certain place located in the north. To do this, you need to know where north and south, east and west are, so that you can move in the right direction. If you start to reason and act in the way that south and north, east and west are relative, then in the end it will turn out that there is no need and nowhere to go; you just may lie down and die because life and death are also relative.

Values, according to Nietzsche, are a point of view precisely because they (unlike the external Absolute) should originate from a person and be set by him as a carrier and manifestation of the will to power. A person here, acting as a fundamental condition, is obliged to realize his own "value" [61]. No matter how strange it may seem, but today *Homo sapiens* is not actually considered as a "value". Although the opposite is widely claimed. However, only in form. The essence is correctly noted by Professor Olga Garanina, who wrote that "anthropological centrism, expressed in the dominance of humanistic values, strife for the affirmation of life and signifying the biophilic life-value orientation of a person, is being replaced by technical and informational utilitarianism, which does not require direct human contact, depriving a person of emotional intimacy and spiritual mutual enrichment. In the structure of the modern anthropogenic world, technogenic elements are gaining dominant importance, as a result of which the value of living structures is leveled out. The space of natural life narrows under the pressure of artificial, technical objects, in communication with which kindness, mercy and compassion are not required" [62].



The following is extremely important: the basis of the assumption of values, according to Nietzsche, is the structure of the will to power. Only in this way the established values lead to survival because life through the will to power lies in their very essence. Without this, any values, and, in particular, the pseudo-values of the 21st century, not only turn out to be unviable by themselves but also lead to the destruction of the society that is guided by them.

It should be further clarified that the Nietzschean concept "the will to power" implies something much deeper than the desire of some people to dominate others with the help of force, politics, etc. "The will to power says that the Existence "is present," i.e., something through what it dominates (as power)" [61]. This is a kind of internal driving force of all living things, something that was at the heart of the Big Bang, and something that makes a blade of grass grow through the earth, fighting for a place under the sun with other existing things. Close to this concept is the key concept of philosophy of Arthur Schopenhauer "the will to live", by which he understood the aggregation of "blind and irresistible" desires that form the essence of our individuality: it is them who ensure the reproduction of individuals and the continuation of the genus [63]. The values that give life are assigned to stand on this basis.

Humankind and every person must strive to overcome, gain a victory, be stronger but not act as proposed in the modern world of liberal structures: to understand and forgive, to live without any goals, without procreation (this way of behavior is indirectly called for by the ideals and goals of human existence imposed by liberalism), without understanding of oneself and society as an intermediate entity on the path to perfection – something that will always need to be surpassed, but not equalize and talk about the relativity of everything and everyone.

Since values are conditioned by human and humanity, which are carriers and manifestations of the will to power and the will to live, no values can be final, the process of their assumption and depreciation is continuous and occurs as once accepted virtual values cease to be applicable to the real world. In this case, the world itself becomes devalued [61]. It is obvious that this is the situation of world depreciation that we are witnessing in the 21st century.

Tolerance, equality, lack of spirituality, relativity, rights of animals, ecological imperative – all this, perhaps, provides conditions for conservation but does not provide space for growth. Consequently, such values are simply inapplicable to the world of technogenic civilization with all its contradictions and problems – primarily environmental ones caused by the technosphere. Once again: values ceased to be applicable to the world, and the world itself began to seem devalued. The assumption of new values, the overcoming of nihilism is necessary in this situation as a condition for the survival of humanity and billions of species of living organisms inhabiting the planet.

"The reassessment of all previous values should be carried out and approved on the basis of the maximum awareness of one's own consciousness of the value essence and the assertion of values," Martin Heidegger explained one of the key points of Nietzsche's doctrine [61]. The value essence of human and humanity is determined, as already mentioned, through the will to power. The essence of values is the provision of conditions for preservation and growth. Thus, having briefly considered the history of the issue in the 21st century, we can systematize the general conditions and requirements for the civilizational values that need to be approved and comprehended:

- 1) applicability to the modern world, adequacy to the real state of matters, problems and opportunities;
- 2) affirmation of the priority of human life and fundamental freedoms (as a carrier and manifestation of the universal will to power rather than, for example, as a carrier of the attributes of a particular social or gender minority);
- 3) consolidation of everything created by civilization during the previous millennia up to the present time and ensuring the preservation of the achieved level in the material and spiritual spheres of social life;
- 4) designation of directions and opportunities for further comprehensive material (technogenic) and social (spiritual) development of each human and humanity as a whole.

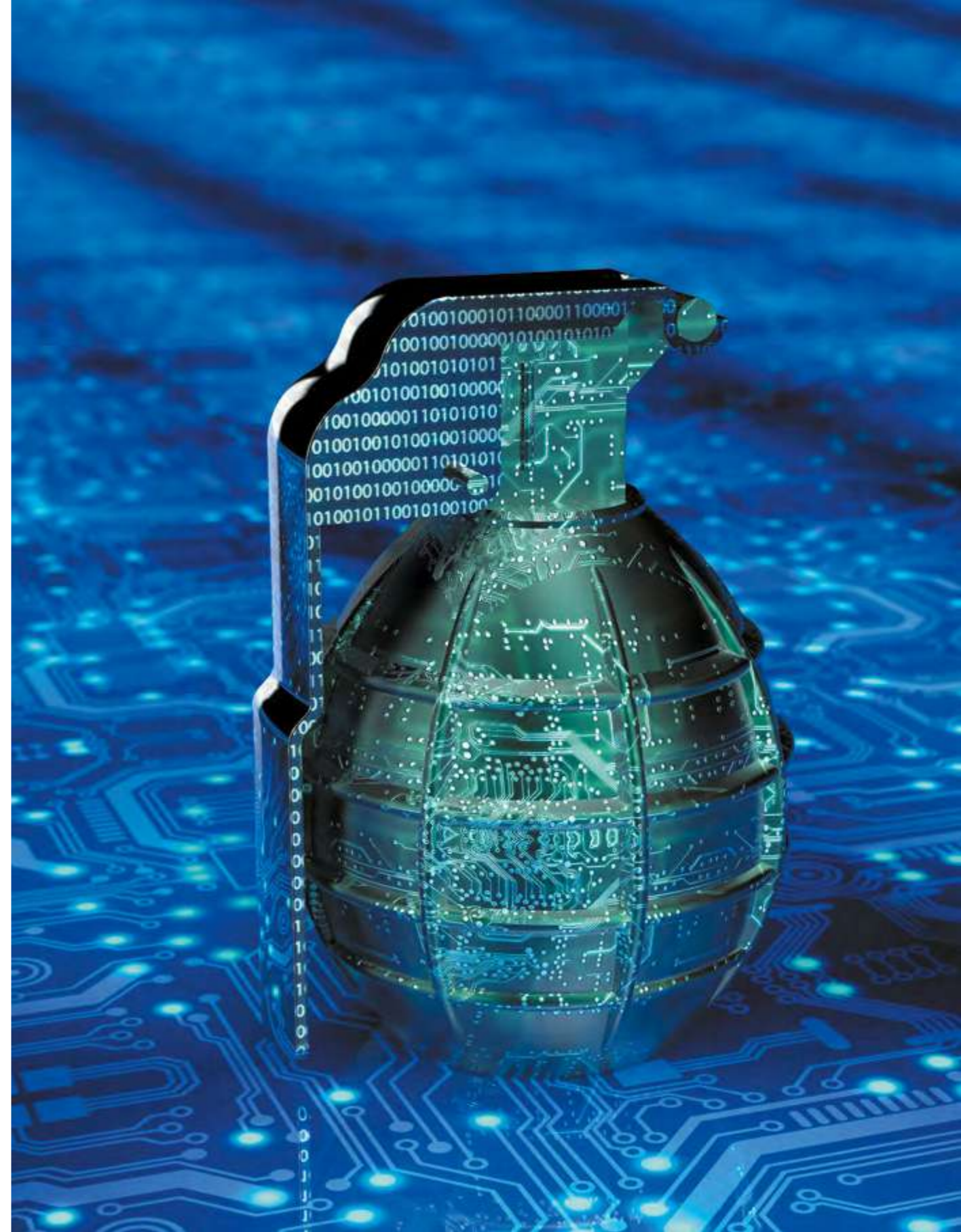
Proceeding from the above requirements and looking at the issue from the standpoint of all humankind, which has entered the turbulent global stage of its existence on the planet long ago, when the interests

and actions of some countries and peoples are closely intertwined with all others, the approval of new values should also be conducted on a planetary scale. Only such an approach can be adequate to the global problems and challenges we are facing in the 21st century. If we accept the second point from the above list of criteria and agree that only humans can be put as a triune biological, social and spiritual matter and only as a subject of the will to power, then there can be no question of limiting them anyhow in that respect. And finally, if anyone should not be limited in their essence and at the same time should have a horizon of development, then such a person reveals to us only in engineering. Only engineering can enable humanity to gain more while preserving what it has.

3.7. Dictatorship of Engineering. Supreme Value

Engineering is the embodiment of human reason and rationality. The functions commonly attributed to rationality can be summarized as follows. When the dispute between reason and sense is resolved in favor of reason, it acts simultaneously as a ground of being, as an instrument of systematization and as a goal-setter. Such is rationalism in the strict sense, in particular the rationalism of René Descartes, considered a classic example. In cultures that prioritize the sensual world, rationality retains only systematizing and goal-setting functions. Finally, traditions that attempt to stand on the other side of reason and sensuality, matter and idea, good and evil reserve only the systematizing function for reason. Here something super- or extra-intelligent is taken as the basis and goal.

Rationalism in its purest form is realized only in refined philosophical doctrines authored by people like the aforementioned René Descartes. Europeans know only three types of cultures: sensual, anti-rational and voluntaristic. By sensual I mean Antiquity with its cult of corporeality and reasonable goal-setting. By anti-rational – the Middle Ages with the dogma of the priority of faith over reason. By voluntaristic, I mean New Europe, driven toward the abyss by scientific and technological progress.



Rationalism in its purest form is impossible because reason must be embodied to become the basis of being. In Descartes' time, it did not yet exist tangibly because engineering and technological devices determined people's lifestyles and affected nature disproportionately less than in the 21st century. By the time this text was written the mind has been embodied and it continues to gain mass in technology and engineering products. However, despite the fact that the products of mind are crucial for the fate of civilization and its survival, mind itself is not yet perceived as the highest value.

The world is still not reasonable. Therefore, the products of intellectual activity, subject to spontaneous will, exist in an uncontrollable and almost chaotic mixture. There is reckless consumption of the planet's resources, and people continue to underestimate embodied intelligence, dreaming of limitless sensual pleasures. Those who believe that engineer, and therefore the embodiment of intelligence, is a servant. This assessment is characteristic of engineers themselves. They accept the humiliating position of servants. They think and act like servants.

If civilization alone retains the survival instinct, the balance of values must change. Engineer must rise to the pedestal. Engineering must establish itself as the supreme value.

Is it possible to imagine the creation of the atomic bomb in a situation where engineering is something identical with good? If an engineer is a servant of the good, and using the power for destruction is a morally and legally condemned crime, a sacrilege equivalent to theft or murder? It is impossible because such a development requires enormous effort, huge funding and the consolidation of society. If society's values do not allow to promote murder through engineering, it will not unite around the creation of weapons.

If engineering takes the place of such values as equality, democracy, sovereignty, quality of life and more, all these values will no longer be reference points but will become a reality. In other words, engineering is the reality today, and the reality that unites everything around it. Nevertheless, it has a servicing status. Liberal values are a virtuality.

However, this virtuality subjugates everything that is real. When we swap the real and the virtual, the virtual will become real.

Why, for example, is there no equality? Some people lack something, some want more than they have enough, some want to dominate others... How can we achieve equality? By restricting everyone's rights equally. Is this possible? Unlikely – because some are strong and some are weak, rich or poor. But what if everyone was not trying to agree on acceptable limits but instead set a goal, on the contrary, to push the boundaries as far as possible by technical means? There would be no need for equality. With an abundance of everything we need – food, space, luxuries, etc. – hardly anyone would infringe on the rights of others. This is confirmed by the experience of rich countries. The richer one is, the less the reason is to offend anyone. Only now wealth is created by robbing each other and nature. If engineering improvement became a goal and value, wealth would arise and accumulate evenly. Available to all.

How is this world that has realized the value of engineering supposed to work? Where will the politicians, the banks, the corporations go? They will remain, obviously. But they will not be an end in themselves but a function. What (or rather, who) can make them give up the will and power with which they have fused over the centuries? Only engineers, into whose hands the will and power must pass to be overthrown for the glory of reason.

In fact, engineers already rule the world. All key resources and tools are directly in their hands. They keep the various machines, factories, utility systems, transportation and defense complexes running. With the full power of civilization at their direct disposal, they manage it on orders. Above them stand those who have nothing real behind them but only a thirst for power and wealth, backed by account numbers stored on servers created and maintained by engineers. Viewed in this way, the picture appears phantasmagoric. Those who have everything have nothing, and those who have nothing possess everything. The unreasonable commands the reasonable. People in the first quarter of the 21st century are ready to recognize this. On the other hand, they have everything at their disposal to change the world by establishing the dictatorship of engineering.

3.8. Engineers' Dream

How can engineers take power? They will not build barricades, no matter how good they are at it, will they? We can look at the ways in which the lower class has taken and whether it has actually taken the power. Through revolutions and civil wars. Who actually occupied the offices of the Kremlin? The revolutionary intelligentsia, who as planned put themselves in selfless service to the interests of the workers. And Joseph Stalin, for example, spent half his life wearing the same overcoat indeed. He built a society of justice. And he did not consider sacrifices. Industrial labor, set as a value, gave society a creative impulse, which allowed, having survived a ferocious war, to endure and develop advanced technologies that made it possible to send a human into space for the first time. It means, there is already a precedent when the type of activity and its product turned out to be decisive and were put on a pedestal of universal reference point. It is logical that against this background a powerful industrialization was carried out.

Despite all the failures of the Russian communist project, it was a colossal experience of realization of the plan on the scale of 1/6 of the land. However, the so-called basis in Russia was not prepared. It took too much effort and sacrifice, which eventually led to its downfall.

The 21st century is the time of utmost readiness for a meaningful global transformation. Engineers have at their disposal all the possibilities for reasonable ordering of the world and bringing it into balance. However, technology is managed by politicians, bankers, corporations and officials hired by them, including presidents of countries, who appropriate the products of engineers' mental labor. If Vladimir Lenin were alive today, he would say that engineers must revolt. Then they would shout "Rob the robbed!" and burn down the skyscrapers of transnational companies. That scenario might happen. The situation has escalated and the survival is at stake again, as in the primitive times. The survival of the tribe called Earth's Human Civilization.

An uprising of engineers is inevitable. The worse living conditions get, the more wars and pandemics will be, the less chance of survival is,

the more hopes will be pinned on engineers. Admittedly, it may be too late. But even then, at the last moment, the very last hope will be tied to an engineer, able or unable to start a fire. Either engineers will rise, or a reasonable power will be found in the world that will raise engineers itself. Otherwise, our Earth's civilization, which is essentially engineering, is doomed to perish. However, at present there seems to be no prerequisites for such civilizational reforms.

Engineers as intellectuals who determine the development of civilization appeared in sufficient numbers and formed into unions, communities, associations and academies in industrial and postindustrial societies. There are two main theories describing the structure of these societies: class and stratification. The first theory divides society into the bourgeoisie and the proletariat, with a thin layer of intellectuals in between. Engineers belong to it. Strata are layers divided not by ownership of the means of production but by income level, education, status, professional affiliation, etc. The postindustrial era is the time when the society is divided into strata. In the postindustrial era, engineers are the middle stratum, and they occupy a subordinate position to the pseudo-elites. "Elites" appropriate the cost of their work, means of production and resources – they take away everything. They grow rich and decide the fate of the world without any clear goal. After all, wealth cannot be a goal because it is incalculable and has no limit. It is the same with power. The "elite" does everything to destroy all the superfluous as soon as possible. And everyone sees it, and tolerates it, and accepts it.

Engineers in the 21st century are philistines and consumers. They are part of a herd of sheep being led to slaughter. They go to work and shopping, play computer games and watch TV like any other techno-consumer of the global consumer society. They are paid enough to satisfy their small philistine needs. They are satisfied with themselves and their fate. At the same time, every day their labor is aimed at maintaining the unreasonable anti-natural structure of the social system.

There's a scene in the movie Terminator 2. An ordinary American engineer at work, in a rich house, with his wife and child. He's surrounded by a nice household. He has a good education and career.



The character gets a big paycheck. Without knowing it, he's developing a chip for a machine that will destroy humankind. The engineer is asleep. What could wake him up? Calamity. And that calamity is relentless. If we don't wake up now, it will come to the irreversible – humanity will be destroyed in a catastrophe in which the quantity of global problems created by society will turn into a new quality. No humanity – no problems related to it.

3.9. Engineer's Moral and Ethical Code

Given the role that engineering plays in our industrial civilization, it can no longer stand outside of morality. At some point, technology has become a determining factor in the survival of nations, peoples and humanity as a whole. It may also turn out to be the main cause of the death of individual societies and the majority of the world's population. The lives and health of people depend on the actions of engineers, and therefore, when entering the profession, they must assume moral responsibility, just as doctors do. An engineering version of the Hippocratic Oath – an engineer's moral code – should be developed and implemented in one way or another. Attempts to create such a code have been made before.

The Code of Conduct of the British Computer Society among the rules of conduct for a member of the Society includes the following: "He shall have due regard of the impact of computer systems, to the extent that he is aware of it, on the exercise of the fundamental rights of individuals, whether these rights are exercised within the organization, its customers and consumers or the general public. A member of the society shall pass on the information available to the client in order to help him understand situations that may arise with the potential harm to a third party. He shall combat ignorance of the kind of technology he is engaged in, and especially in those areas where the application of that technology appears to have dubious social merit" [64].

The Code of Ethics of the National Society of Professional Engineers of the United States says: "Engineers shall hold paramount the safety,

health and welfare of the public. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate. The ethical standards governing "engineer - employer" and "engineer - client" relationships require the good faith fulfillment of business obligations: to provide the client or employer with what one has promised to produce; to complete work on time and within budget and, if this cannot be achieved, to alert the client or employer as early as possible so that corrective action can be taken; not to disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer... Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission" [64]. However, there is something missing in all the versions presented. The precepts are inconsistent and seem to ignore the actual role in civilization that engineers play.

Engineer's code should be built from the perspective of supreme values and include universal rather than professional provisions.

1. Engineer is called to change the world.

Changing the world by engineering is a constant and irreversible process. Understanding this must be coupled with an awareness of responsibility. Engineers have more reason than anyone else to control the world. Their role in the world is to organize the most efficient interaction of substances, objects, mechanisms, devices, technologies, people and societies to achieve practical results. Engineers truly rule the world.

2. Engineers shall know and respect the history of the profession and honor their teachers.

Without knowledge of the history of engineering, it is impossible fully to understand the significance of this phenomenon. Nor is it possible, without studying the experience of predecessors, to avoid repeating their mistakes. Only by looking at the overall picture it is possible to see how haphazardly and in spurts the technologies were developing.

The growth of engineering was not subordinated to any general plan or purpose; therefore, the chaotically growing Earth's industry came into conflict with Live Nature, bringing civilization closer to a fatal ecological catastrophe.

Acceptance of the history of one's profession should be through teachers as bearers of knowledge vital to all humankind. The status of the teacher in society, and especially in the eyes of pupils, must correspond to the extent of the teacher's vocation.

3. Each engineer, as an elementary genetic unit of a living organism - the Earth's engineering civilization, determining its existence and development, shall serve the good of the whole universal society, not its separate part.

When creating (developing) engineering solutions, the author should not be guided only by personal interests as well as the interests of other people of any communities. The primary goal of any engineer is the good of the entire human civilization. The good of humanity is the preservation of life and improvement of the quality of life of all members and strata of all societies inhabiting planet Earth, without any forms of birth control and life expectancy restrictions, including all possible forms of genocide and segregation.

4. Life in all its manifestations and biodiversity is the engineer's supreme goal.

An engineer should formulate and accept only those goals, which contribute to prosperity of life in our all-civilizational home - the planet Earth's biosphere. Creating devices to destroy life is unacceptable as it goes against the essence of engineering. As a form of creativity, engineering must accomplish transformation without destruction and cannot serve to destroy life either locally or globally.

The potential consequences of the operation of the devices created by engineer are also important. Indirect killing must be avoided as much as possible.

5. Engineering is the highest value of civilizational life.

Engineering becomes a supreme value at the moment it incorporates a moral dimension and takes as its goals the service to life and good of humanity. The definition of engineering as the human

activity of transforming the reality around us is complemented by the fact that this activity is aimed at achieving and promoting good and therefore is opposed to evil. Engineering encapsulates value not in itself but in serving life by identifying with it and accepting its own inner limitations. On the other hand, life becomes a measured engineering and mind acting through it as its embodiment. The noosphere of the planet (the sphere of reason), which is the civilizational development of the biosphere, is formed.

This provision should not be taken indiscriminately and extended to all people. We are talking about the value of life as a universal asset. At the same time, everyone can and should have their own values in their life. Engineering serves the general reasonable arrangement of life so that all can find their place in it and choose their own reference points.

Without putting forward and adhering to the above principles, the world is doomed. Engineers will inevitably continue to act. If engineering remains morally neutral and does not become a regulator, the consequences of these actions will either destroy all living and natural things, replacing them with inanimate and unnatural things, or destroy our civilization, which we know and are a part of, because a degraded and thinned humanity that has returned to a primitive way of life can hardly be called a civilization. It is also possible that both scenarios will occur at the same time. Value-neutral engineering generates false directions of development leading to the death of civilization.

3.10. Necessary Education for Engineer

We have described above that today's world for its survival can and must be interpreted as a new living and creative project managed by talented scientists and engineers. False directions in attempts to reorganize the world have led and are leading us to monstrous catastrophes. Pseudo-scientists who carry out their experiments solely for the sake of the experiment itself, so-called capitalist elites for whom personal ends always justify any means, fanatics

devoted to serving the ideas of their own power, cynical economists and politicians who talk about the improvement of society – all these are the servants of an infectiously dangerous and vivid phantasmagorical world².

The consciousness of these usually charismatic and rational people is always self-centered and sees no other reality in the world but their own. Such consciousness does not know true values at all and, being immature, is incapable of true creativity.

Together with the long process of secularization, modern secular society has been deprived of a deep inner spiritual dimension in which, on the one hand, humans were aware of their mortality and, on the other hand, felt a sense of belonging to a reality of a higher and more meaningful order. Ritual practices and religious symbols, as well as wisdom rooted in the national past, were attuned to this spiritual reality in society; the meaning of human in the world was defined as service in a place of temporary habitation, followed by the heavenly world.

The qualities that the spiritual traditional society fostered have been completely forgotten in the 21st century. In the consciousness of a European-type human, the individual and personal are superior to the universal; self-centeredness and self-love are normal properties of a "developed" personality; insolence, ambition and licentiousness of manners are better than faith, modesty, respect for elders and self-critical attitude. The world justifies and legitimizes human passions and pleasures, substitutes good for evil or levels moral categories, declaring them relative. Humans know only their own and accepts only what they need, and the world around is a mean of satisfying endless needs that do not know quenching and satiation, both material and informational, always having material carriers.

² "The lust of greed and love of money for its own sake creates one of the most fantastic worlds, furthest removed from the real world of being – the world of capitalism, of banks, stock-exchanges, paper money, cheques, IOU's, advertisement, competition and pursuit of easy gain. The financial world is a terrible phantasmagoria, utterly remote from the world created by God and adding nothing to its richness, fullness or perfection. Leon Bloy was right in saying that finance is a peculiar kind of mystery-play," wrote Nikolas Berdyaev in his book "The Destiny of Man" [55].

Humans do not strive for self-overcoming, and mass culture from childhood persistently urges not to go beyond the consumerist attitude to life, to accept and defend themselves as they are, to develop only for increasing their value on the labor market and to monetize skills in order to reach the maximum scale of consumption.

Since the time of Cartesian binary logic, the “separation” of the world has been internalized and subject-object relations have been asserted, to the point where people can destroy the earth they walk on and live on without feeling that they belong to it. Because the thought is firmly lodged in the consciousness: “The earth I walk on and the planet I live on are not me. I am the money in the bank, the house, the car, the devices and other things that I have somehow acquired and have.” This trend in the world must be countered by the simple and sobering realization that the world, like all living things, requires attention, special care and careful handling.

Indeed, how can engineer have a moral and ethical code if it is not specially formulated? In physics and chemistry textbooks for school-children you will find theoretical knowledge about the structure of matter, various ways of interaction of bodies and practical illustration of physical laws. Where is the respect for the profession, including teachers, where is the service of the profession for the benefit of humankind and life as the highest value that needs to be preserved? The teacher in the 21st century is no longer perceived as a pedagogue but as a manager of educational services. The vast majority of parents and children, after them, treat teachers as if they are in their personal service and has no respectable professional status. With this attitude, students will learn nothing. Instead of serving humanity, they are propagandized to follow purely personal goals and interests. Young people may dream of contributing to the achievement of universal goals at an early stage, but these dreams are mostly not widely applied in society and are not nurtured in the existing education system.

Everyone first builds their own career and personal life and then, as he or she imagines, will start to “help the world”. However, this moment rarely comes because the priority of one’s own tasks is always higher, and security is always not high enough. Life is also not the highest value for human, and so engineer can invent and participate

in turning rivers, producing means of mass murder, dangerous pathogens and vaccines, machinery and equipment that pollute the air, soil and water without questioning the morality of such a process. This happens with the silent approval of the consumer society, which also needs to provide for its own needs first and foremost. In order to eradicate such an attitude and to educate moral engineer of a new formation, a fundamental revision of the education system is necessary. As an example, it should be introduced into the field of study along with technical sciences:

- humanitarian disciplines, including those at the intersection of scientific and technological and philosophical understanding. In particular, “Ethical bases of interaction between human, machines and biosphere”, “Bioethics”, “Civilization and planet”, “Cosmism and noosphere” and others;

- religious and philosophical teachings. Undoubtedly, an individual has the right to believe in what he or she considers worthy of his or her faith. However, the task of the educational system is to familiarize the forming consciousness with the basic ideas and principles of moral and ethical doctrines. At the very least, this will help in understanding that the world has some spiritual dimensions and that it is more complex, deeper and richer than the surrogate imposed by mass culture.

Education is something everyone is involved in. Through education, a socially oriented person is formed. At any moment of time. And that is why all reforms here and now should start with education. In the devices, machines and technologies the engineer designs, he must effectively combine and use knowledge from various fields not only of science and technology but also of society (thanks to which, in fact, our human civilization was created), which differs significantly from the civilization of an ant hill, a bee hive or a flock of dolphins.

Civilization did not appear by itself – it was created by engineers, whose achievements were used not only by them but also by the whole society – first by tribe, then by nation, state and humankind as a whole. Consequently, we can rightfully assert that our Earth’s human civilization is engineering by the way it was created, and not technogenic, technocratic or industrial, as it is now called. “Engineering”, “technocracy”, “industry” are not the essence, they are symptomatic.

A real doctor does not look for symptoms, which are visible to the naked eye, but for the causes of disease. A doctor who knows not only the symptoms but also the whole human body, who understands what health is, will be able to cure the patient.

The moment has come when engineer needs to start acting in the moral dimension as well. Ethical considerations must be incorporated into the structure of engineering action along with technical and scientific considerations. The task of education is to instill this understanding, thus providing the conditions for a reassessment of values and the triumph of engineering as a purpose-driven beginning to save the world.

3.11. Power of Engineers

Engineering can and must become the benchmark of power as a supreme value. Out of this, the political and economic order must be reformatted in the future. Politicians and bankers will perform a service function for engineering, not the other way around, as it happens now. This reformatting must happen evolutionarily, without upheaval or revolution, i.e., without fanaticism. Never before have good civilizational goals been achieved through plunder, wars and revolutions.

Engineers have created and concentrated incredible technological resources in their hands. They actually control them. It is enough to define a goal and achieve coordinated action to reconfigure the entire system with one deliberate action. A longer way is to undertake a series of acts aimed at a civilizational reset. In the digital age, when everything is controlled by information, we have everything we need for this.

A hundred programs focused on transforming major economic sectors such as agriculture, energy, residential and industrial infrastructure, transportation will be able to set new algorithms for political and economic interaction. These programs can be implemented by engineers themselves through communities and computer products. Humanity has had such experience by the 21st century. Electronic services such as Google or Facebook have already changed the reality. They did it in a short period of time. The main problem is that this

engineered product ultimately served the values of the capitalist system. It was designed for enrichment and consumption. New products can be creative, tied to engineering projects on a global scale.

The technologies developed by engineers also include new financial instruments. In the 21st century, a crowdfunding mechanism has been created that allows a large number of people to jointly finance new engineering developments. If we divide the cost of even the most grandiose engineering structures by the population of Earth, the sums can be negligible. For example, the cost of the International Space Station is 150 USD bln. This is less than 20 USD per inhabitant of an eight-billion planet. The US defense budget for 2023 is almost 900 bln USD. And even 110 USD/person per year is not a lot of money.

Theoretically, with 100 USD (27 cents a day) annually, it is possible to equip an army that is not under the control of any country. Financing of large programs can be carried out here without state participation. And the society united by technological goals will itself become a subject of politics on a par with the state but without "leaders", "chiefs", "elite" and all others, who appropriates not only a part of people's income but also natural assets of entire countries and results of intellectual labor of their peoples.

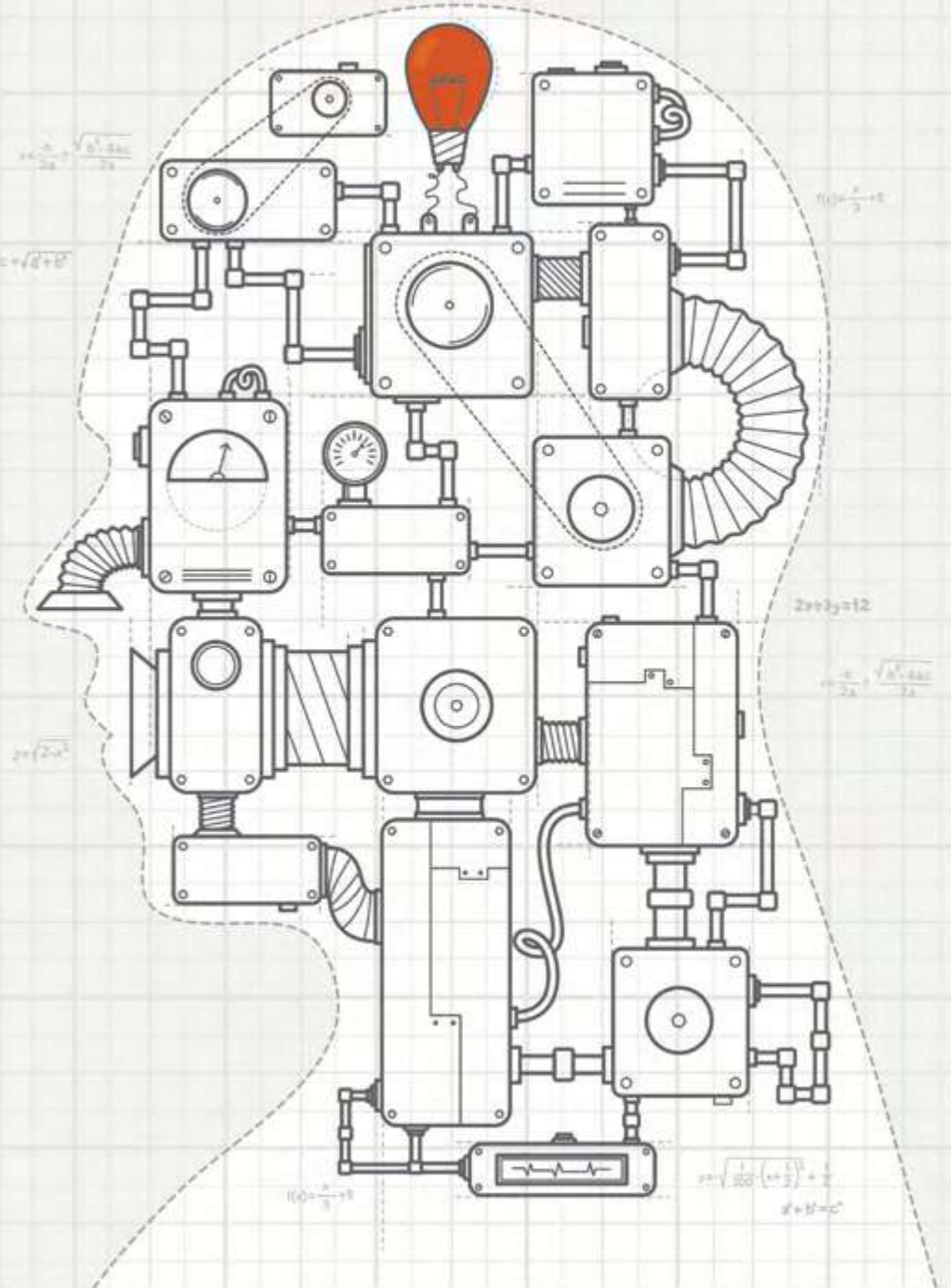
Entering into technological competition with states and global corporations, the engineering community is able to offer universal solutions that are more effective than those made on the basis of interests and benefits of some isolated groups of people. At this level, it is no longer a question of robbery, war or revolution for the sake of power and enrichment. Common interaction and common financing are possible only around particular, constructive and practical targets. Only engineering can offer such goals.

As a result of the competition between creative and destructive engineering solutions, the former will inevitably win. In the end, they will be accepted by everyone and spread everywhere. The fact that such more efficient and unified devices, systems and algorithms have not yet appeared in the first quarter of the 21st century is explained by the lack of real competition. The right to technology and to large technological projects is concentrated in the hands of the "global elites". They pursue their clan interests, and efficiency is not favorable to them.

The more complex and power-hungry a device is, the more substances and energy rotate in it, and the more it consumes. The more it takes to run the infrastructure, the more it sells and buys. The more extensive the trade, the grander the profits. "Elites" who have access to resources (it does not matter what – raw materials, technology, humans, etc.) cannot be interested in achieving high efficiency – it would mean lower costs and therefore lower revenues. That is why tools are needed to enable engineering with its specific and inherent manner of goal-setting to compete with the obviously voracious systems produced by capitalism. Fortunately, in the 21st century, engineers have been able to create such tools.

It is enough to create effective global engineering systems in key sectors of the economy adequate to the level of development of science, technology and society of the 21st century to achieve the goal. The revolution will be unnecessary. In the ideal but possible situation of the future, in which we have unlimited resources of space at our disposal, money speculations and wars will become a senseless anachronism. Politicians and bankers will begin to simply fulfill their functions as plumbers and electricians, janitors and waiters. Even if this will not happen overnight, it will come true step by step, as soon as engineering has a purposeful force in the development of society.

The inevitable need to recognize engineering as one of the highest values may lead to a different scenario. In this case, one of the states voluntarily, with the support of its citizens, starts to consistently implement a comprehensive program for reasonable engineering reorganization of transport infrastructure, urbanism, energy and agriculture on biosphere technologies that are already available – they are developed and tested by the international Unitsky Group of Companies, which already employs more than 1,000 engineers. In this case, such a state will boost the economy many times over and become a world leader in the creation and implementation of highly efficient and environmentally friendly industry-forming products. However, for this purpose the country must have real sovereignty and absolutely not depend on the interests of global political and economic centers. Is there such a state in the 21st century? By the time of writing this text, the question remains unanswered.



In any of the presented scenarios, the power of engineers will not be exercised directly and owned by any group of people. The power will be a universal goal-setting that is shaped by engineering rules that require specificity and efficiency. Engineers will continue to serve their machines so that the machines will serve all people without harming Live Nature. The rest of the society will serve itself, including engineers, providing their needs and opportunities to realize their ideas. This is the only way to achieve harmony between machines and people – by linking them in a common cycle, breaking the historically established system in which engineers and all others serve the rich and kings, creating for them whatever they want, even their own gallows and guillotines.

The fact that engineers should not and do not want to lord it directly is important. No one, no group of people should lord it over another. My statement is rooted in engineering logic. If society, civilization is a super-complex system, then no part of it should be determinative. There may be significant and less significant elements, there may be elements without which the device will cease to work, but there cannot and should not be a part for the sake of which the whole mechanism would exist. From an engineering point of view, this is absurd. Any engineering device, including the engineering component (industry) of our civilization, must have a meaning of existence beyond itself. Just as a car serves for transportation, a house serves for protection from wind, rain and cold, and a refrigerator serves for food storage, so civilization as a complex engineering device should serve the survival and development of humankind, not the enrichment of anyone, be it even the most outstanding engineer. Only by uniting around engineering goals and objectives, people can achieve this in the conditions of the 21st century.

A similar synergy can be observed in our body. What is the most important thing in it: the heart, kidneys, lungs, brain or intestines? They are all important because their totality plus consciousness, spirituality and reason (as their common function) is what makes *Homo sapiens*.

It may seem to some that a model is being proposed in which humans serve machines. Yes and no. One might ask the same silly

counterquestion, “In our organism, does the brain serve the gut or does the gut serve the brain?” They do not serve each other and they do not owe each other because they constitute a single whole living organism. So our engineering civilization is a single biotechnosocioorganism.

People will not cooperate with machines that poison nature, kill and deprive them and their children of a future. People will deal with machines that help and care for them. And it will not be a service but a care, just as we care for the garden we plant or the pets that live in our home. The way a race car driver cares for the engine of his car, and an artist cares for the brushes and easels. They take care of things that take care of them and harmonize their lives. If in the 20th century the relationship of master to slave was formed between human and objects – worthless and inefficient – in the future, when engineering developments are improved and filled with value, the relationship to them can be conceptualized as a partnership. This is a reasonable civilization pattern that does not require any upheavals for its establishment but only awareness, will and revaluation of values.

The dictatorship of engineering by the middle of the 21st century cannot be established in the course of an open social revolution. It is a long process. Technologies are becoming more and more advanced and interconnected. Engineering thinking is becoming more and more global. Realizing deeper and deeper the significance and possibilities of the knowledge in their hands, engineers try to apply it on a planetary scale, making the first attempts to reorganize the Earth’s world as an engineering project. One by one, the decisions made by these true masters of the world are shaping the present and the future. Something must push them to borderline conclusions. They must fully realize their role, responsibility and mission. Then a series of actions, carried out independently of each other but in a single logic, can overnight reformat the entire system serving Leviathan. From the engineering point of view, there is nothing impossible in this, as long as the chosen path fits within the boundaries of physical laws, genetically prescribed by the Creator at the making of our Universe, in which we all live now.

Earth has more than enough resources for the prosperity of 10 bln people. We only need to give them a reasonable, engineering assessment and use them wisely.

4. ENGINEERING RECONSTRUCTION

4.1. How Many People Can the Planet Accommodate

Before having a vision of the engineering, which, by some means, have become the driving force and the highest value of civilization and can make the world a better place, it is necessary to make sure that there are enough resources for humanity to continue civilizational development.

What is the margin of safety and what are the actual capacity limits of the planet and its biosphere? Will they be achieved in the 21st century? Or rather the rationalization of their use can significantly (by hundreds or even thousands of years) delay the moment of reaching the point of no return? Is everything that the capitalist pseudo-elites scare people with (the greenhouse effect, the carbon footprint, the impending shortage of food and energy, overpopulation) really that dangerous? Or are these only myths and horror stories, the cultivation of which pursues goals that are fundamentally different from those proclaimed? How to estimate the capacity of the biosphere from an engineering point of view? This will require only figures and facts.

4.1.1. Greenhouse Effect and Safe Carbon Capacity of the Earth's Atmosphere

The greenhouse effect on the planet is caused by the presence of polyatomic gases in the surface layer of the atmosphere. These gases are opaque to thermal radiation and include water vapor, carbon dioxide, methane, ozone, nitrogen oxide, freon and others.

Water vapor, of which there are 12.7 tln tons in the Earth's atmosphere, is the most active greenhouse gas in terms of its influence on the planet's rising temperature. Its contribution to the total greenhouse effect on Earth, reaching 32 °C, is 20.2 °C, compared to the 7.2 °C that CO₂ contributes [65].

The greenhouse effect on Earth now is, on average, up to 78 % due to water vapor and only up to 22 %, or 3.5 times less, due to carbon dioxide. Contributions from other gases, including methane, is negligible [66]. That being said, in terms of one ton of gas in the Earth's atmosphere, the greenhouse efficiency of a ton of CO₂ is only 1.5 times higher than the greenhouse effect from a ton of water vapor.

Without greenhouse gases, the average temperature on Earth would be about -18 °C, compared to today's average temperature of about +15 °C, meaning that all rivers and seas would permanently be frozen and there would be neither flora nor fauna on the planet. Therefore, the greenhouse effect is the greatest good. The life on Earth, most likely, would not exist without it. Or the protozoa originated on an early hot planet would continue to exist somewhere in the unfrozen depths of the oceans.

Emissions of industrial water vapor, like that from cooling towers of nuclear power plants, are not so harmless because each ton of steam entering the surface layer of the atmosphere is equivalent in terms of the greenhouse effect to 0.67 tons of carbon dioxide. Therefore, the environmental friendliness of a nuclear power plant is an illusion not only because of problems with radiation but also due to climatic factors, since for every kilowatt-hour of electricity generated at a nuclear power plant, 3.6 kg of water vapor is released into the surface layer of the atmosphere. In particular, in 2015, Russian nuclear power plants emitted 730 mln tons of water vapor into the atmosphere. In terms of CO₂, that equals about 490 mln tons of carbon dioxide [65], which, as example, significantly exceeds greenhouse gas emissions by all Russian transport, including cars.

Additional sources of water vapor entering the planet's atmosphere from human activities (in bln tons per year): evaporation from waters used for domestic needs – 180, evaporation from industrial

waters – 800, from river flows for irrigation – 5,400. In total, in CO₂ equivalent (from the standpoint of the global greenhouse effect), this amounts to more than 4 tln tons of carbon dioxide.

Considering that the greenhouse effect from a ton of water vapor in the atmosphere is only 1.5 times less than CO₂, the impact of anthropogenic activities on the water vapor circulation and its contribution to the greenhouse effect is 140 times (!) greater than the carbon coming from all industries on Earth, including transport.

Today, it is more important for humankind to optimize water consumption in everyday life, industry and especially agriculture to organize a successful fight against “global warming”. It is more significant than, for example, at the behest of globalists, to redirect our efforts to “carbonic windmills” because the decarbonization program promoted by “deep power” pursues completely different goals, nourishing their obsession with global warming. But when globalists realize the importance of water vapor in the greenhouse effect, they would most likely propose a radical “solution” to “optimize” planetary processes in their demonic style: to roll the entire World Ocean into asphalt, since it is the main source of water vapor in the Earth’s atmosphere.

The entire multimillion-year-old history of the life development on our planet evidences that carbon dioxide is not the main climate-forming factor. For example, 250–320 mln years ago, in the Carboniferous period, the concentration of carbon dioxide was two times lower than it is now, but the average temperature was 10 °C higher [67]. Meanwhile, 150–200 mln years ago, the content of CO₂ was almost an order of magnitude higher than in 21st century – 0.3 %, and 400–600 mln years ago – even 0.6 % [68], although there was no global warming, on the contrary, almost the entire planet was covered with ice.

The total carbon dioxide in the Earth’s atmosphere amounts by the time of work on the text to 3.03 tln tons, or about 0.038 % of the total mass of the planet’s atmosphere. Of that, 550 bln tons annually dissolve in seawater and transform into living matter due to photosynthesis [69]. On average, all atmospheric CO₂ participates in the carbon planetary cycle every 5–6 years.

The creation of organic matter annually consumes about 300 bln tons of carbon dioxide (about 10 % of CO₂ in the atmosphere) [70]. Most carbon dioxide mass returns to the atmosphere and hydrosphere due to the oxidation of once-living organisms and their waste products.

The most significant amount of free carbon dioxide in the biosphere is in the ocean’s upper layer – 140 tln tons, which is 46 times greater than in the atmosphere.

Due to the creation of organic matter in the Earth’s biosphere, the carbon cycle is completely closed. Only an insignificant part of the total organic carbon absorbed by plants annually passes into the lithosphere and leaves this cycle.

Studies have shown that the current level of carbon dioxide in the Earth’s atmosphere for effective photosynthesis is 2–3 times lower than the optimal one. The data on the optimal levels of CO₂ in commercial greenhouses is cited at levels of 0.1–0.12 % or more [67]. Based on this, we can conclude that there is a shortage of carbon dioxide in the Earth’s biosphere from all living matter point of view (and not from a “human-globalist” – a very limited in biospheric knowledge – one of the billions of living organism species on the planet) by hundreds of billions, if not trillions, of tons.

An increase in CO₂ concentration in the atmosphere is caused not so much by industry and transport as by its return from sediments in the ocean and on land due to a raise in the average temperature on the planet. It boosts crop yields and promotes the growth of forests, meadow plants, fish, crustaceans, mollusks, algae and corals in the ocean.

Therefore, the global level of industrial CO₂ emissions in the 21st century (about 30 bln tons per year, or about 1 % of its content in the atmosphere) will affect the greenhouse effect at a maximum of 1 % of the previously mentioned 22 % carbon dioxide impact on the climate, for a total of a mere 0.22 %. This is significantly lower than the margin of error in measuring the average temperature on the planet and the average CO₂ content in the atmosphere. An additional greenhouse effect will manifest only if this industrial carbon dioxide remains liberated instead of being bonded by green

plants or green technologies in industrial regions or dissolved in the ocean.

Therefore, the recently vilified anthropogenic CO₂ is entirely safe for the biosphere and it is not just not excessive but does not even make up for the carbon deficiency in the Earth's atmosphere.

It is important to remember that the dry matter of any organism, not including the oxygen and hydrogen contained in all living cells, is about 60 % of carbon. Carbon is the main chemical element of life on Earth, including humans. The food chain for carbon begins precisely in the atmosphere, where it should be present in sufficient quantity from the viewpoint of the evolution of the living biosphere, not the dead technosphere created by human civilization or artificial intelligence, which does not need a biosphere at all.

4.1.2. World Energy Consumption

The term "world energy consumption" refers to the total energy consumed by our civilization. It includes all the energy obtained from all energy resources and used in all industrial and consumer sectors of the world economy. This measure of consumption is an essential indicator of a technogenic civilization's level of development in the productive-economic and sociopolitical fields.

The average solar energy density at the outer edge of the Earth's atmosphere is 1.366 kW/m². It has already been calculated that without this energy on the planet (if the Sun is "shut off"), the Earth's atmosphere would drop to -20 °C over a week and then to -73 °C over a year. After a few years, the temperature on Earth will drop to -240 °C and remain at this level [71].

The prevailing opinion is that over the whole new history, when the Earth's industry appeared everywhere and started to develop intensively, solar radiation was stable, with variations within a 0.2 % range. Such variations in the intensity of solar radiation will amount to only 2.732 W/m², which, with a cross-sectional area of Earth of 130 mln km² that includes the atmosphere, provides fluctuations in the power of external energy falling on the planet of 350 bln kW.

This value exceeds 167 times the total rated capacity of all power plants worldwide, equal to 2.1 bln kW. With a population of 8 bln people at the beginning of 2023, this amounts to only 0.26 kW of electric power per one inhabitant of the planet.

We assume that the same fluctuations in the power of the planet's extrasolar energy supply from the technogenic civilization are acceptable in the future and will not lead to global environmental problems. Moreover, the power of solar energy reaching Earth is unstable over time due to changes in the distance to our star (from 147 mln km in January to 152 mln km in July). Such fluctuations during a year can be up to 6.9 %, which is 34.5 times greater than the 0.2 % mentioned earlier, and amount to 12 tln kW. With this background, 2.1 bln human-made kilowatts of power plant capacities (less than 0.02 % compared to 12 tln solar kilowatts) do not have any significant impact, which should be apparent to any more or less competent independent expert. So, due to annual fluctuations in the power of solar energy, the temperature in some regions of our planet can reach 100 °C: from +40 °C in summer to -60 °C in winter. It is unlikely that anyone in this region will notice the human-made climate changes by 0.02 % towards warming, for example, up to +40.01 °C in summer and up to -59.99 °C in winter.

Besides, the luminosity of our star increases by 1 % every 110 mln years due to the accelerated combustion of hydrogen (the power of solar energy reaching Earth grows at the same time by 1.78 tln kW). Therefore, in 4-5 bln years, the Sun will go as far as turning into a red giant, expanding and simply swallowing Earth [72].

The capacity of the world energy consumption in the first part of the 21st century, considering the combustion of the nuclear power industry and hydrocarbons in various furnaces and internal combustion engines, is about 20 bln kW, or 2.5 kW for each inhabitant of the planet. Combined with an increase in power of energy consumption per capita to 5 kW (i.e., with annual per capita energy consumption of 43,800 kW·h), considering its environmental optimization the safe capacity of the terrestrial power industry is: 350 bln kW / 5 kW/person = 70 bln people of the planet.



From the above analysis it follows, with a future Earth's population of 10 bln people, the power capacity that is safe for the biosphere per one inhabitant of the planet will therefore be: $350 \text{ bln kW} / 10 \text{ bln people} = 35 \text{ kW/person}$. This amount is 13.5 times higher than the current per capita power consumption of the entire terrestrial technogenic civilization. Being more precise: these 350 bln kW of power are not critical for the biosphere, since the energy threshold of security for it will be at least an order of magnitude higher.

4.1.3. Biologically Safe Capacity of the Biosphere for the Technogenic Human Population

According to the latest data, in the 21st century about a trillion species of living organisms currently populate the planet, of which we know less than 0.0001 %: animals, plants, fungi and microorganisms (microbes, viruses, bacteria, protozoa, etc.), whilst the non-microscopic species (visible to the naked eye) account for no more than a million species. All these living beings have been residing on planet Earth for millions and some for billions of years. In the course of evolution, everything here has evolved together, so everything in the Earth's biosphere is harmoniously arranged, there is nothing redundant, and there is no need to improve anything.

We do not need to fight microorganisms; we must learn how to co-exist. We will lose any war declared on microbes because more than 10,000 species of bacteria, viruses, archaea and fungi live in our bodies. The human microbiome has an astounding number of inhabitants, about 100 tln bacterial cells. They constitute a highly complex human ecosystem and are the basis of the immune system, especially the intestinal microbiota, which consists mainly of soil microorganisms – they feed, water and even treat us. A person has much fewer own cells – about 40 tln, so there is a risk of harming them, since it is impossible to fight a single representative of unwanted viruses (for example, COVID-19) without disturbing the developed over millions of years symbiosis between trillions of species of useful microorganisms and the human body.

The medicine prescribed by the doctor may fix one thing while it breaks another. The treatment is not much important itself but the prevention of diseases by strengthening the immune system, which is our universal medicine. This requires healthy lifestyle, both physical and spiritual; proper and healthy nutrition, grown on fertile soil without chemical fertilizers and pesticides; living natural spring low-mineralized drinking water; clean air that is replete with phytoncides from medicinal plants and flowers.

Even if 100 bln people live and work on the planet, their biomass will be only 0.05 % of the Earth's biosphere biomass, which, for example, is less than the mass of all ants, mosquitoes and flies (including their larvae). And this in no way will lead to global problems if, of course, humanity stops fighting nature and begins to coexist with it, as one of the biological species, according to the biospheric laws that have developed over billions of years of evolution.

4.2. Engineer Reforms: Engineering Epoch Technosphere 2.1

The engineering of the 21st century has enough resources and unprecedented technical capabilities for the positive transformation of the world created by previous generations of engineers. However, this will require radical transformations in the system of value orientations and practical goals of society. The reassessment can be carried out as a result of the approval of the corresponding political will, which is hardly realistic, taking into account the modern specifics of both political and economic goal-setting. Another option for initiating a reassessment is to launch powerful engineering projects through social and financial instruments, which by this time had been developed and practically implemented by engineers. Crowdfunding based on digital platforms can become such a system. At the same time, launched projects should cover the main areas of the economy and offer solutions aimed at a deep transformation of the basic sectors of the world economy.

Engineers could start the changes by redesigning four key industries: power, agriculture, transport, urbanism (residential, social

and industrial infrastructure). The goal of the changes should be provision to the humankind of environmental, raw materials, food, energy, transport, infrastructure, demographic, social and other types of security as well as the harmonious spatial development of civilization on a global scale. A significant economic effect should be based on large volumes of creative work. This means that the desired projects must have a huge potential, be feasible and effective. A complex of such projects is designed to ensure a deep reform of civilization and its entry into the epoch Technosphere 2.1. What can it be and on what technologies its basement is possible?

4.2.1. Power Industry

Oil shale's total global biosphere reserves are estimated at 650 tln tons, and brown coals is estimated at 4.9 tln tons [72, 73]. The organic matter of oil shale is formed from the biomass of predominantly nonvascular algae (sapropel components), to a lesser extent – from land plants (humic components) and partially – animal organisms. The content of organic matter, including proto petroleum, in shales is on average 45 % varying from 10 % to 80 % in different fields.

The mass of organic matter in brown coals and oil shale can be estimated at 300 tln tons with an average specific heat of combustion of 33 MJ/kg ($Q_{\text{bdaf}} = 29\text{--}37 \text{ MJ/kg}$), or an average of 9.2 kW·h/kg. These reserves of oil shale and brown coals are sufficient to generate approximately 2.7×10^{18} kW·h of energy, of which 1.2×10^{18} kW·h is electricity, with an average efficiency factor of a coal-fired thermal power plant equal to 45 %. Then, with an average annual per capita energy consumption power of 5 kW/person (!), where 2.25 kW/person is electric energy and 2.75 kW/person is heat, oil shale reserves will provide 100 % of energy to the Earth's population of 10 bln people for 5,400 years (!).

Relict Solar Bioenergy (RSBE)

The energy stored in brown coals and oil shale is relict (ancient) solar energy created by living organisms that were on the planet

100–450 mln years ago. Therefore, oil shale and brown coals can be used not so much for generating electrical and thermal energy but for producing relict living humus. This being the basis of the fertility of any soil because such biohumus will have the same chemical composition as an ancient tree that took everything necessary for life from the relict soil.

It is proposed that we should not burn fossil fuels completely; instead, perhaps 50–75 % at most. The combustion waste from fossil fuel burn, including ash, slag, sludge, dust and flue gases, must be mixed with the unburnt 25–50 % of shale or brown coals, plus any raw organic materials, like grass, peat, sawdust, manure or household compostables. The resulting multicomponent mixture, in which organic and mineral raw materials are present, is finally processed into fertile humus in bioreactors using specially selected communities of aerobic and anaerobic soil microorganisms taken from the world Bank of fertile soils created in Belarus on the territory of the Unitsky's Farm Enterprise.

The resulting relict biohumus can be added to the soil at a level of 2–3 %, which, with this proportion, would make even the most barren desert sand fertile. Ideally, highly fertile soil could be created around the power plants. Gardens will grow on it. In this vision, grapes, apples and other agricultural products become the net positive "waste" of the operation of relict solar biopower plants.

This is easy to achieve, as more than 80 chemical elements that make up all terrestrial living organisms, including ancient plants, turned into coals and shales in prehistoric times, and all of them again, through the restored relict soil, will give new life to new organisms in 100–450 mln years only.

Most prevalent in the 21st century traditional thermal power plants emit waste into the atmosphere, causing acid rains that kill all life in the vast areas it touches. At the same time, the substances contained in these rains, for example sulfur, belongs to macroelements and is vital for all living organisms. So, the daily amount of sulfur an adult requires is 4–5 g (our body contains about 100 g of it), and it should enter the body of a plant, animal or human not in the form of acid rain but in the form of organic compounds with food.



Excess heat from power plants (about 55 %) can be sent to the greenhouses or be converted into the cold in hot countries and sent to cool orangeries. Furthermore, carbon dioxide will not be emitted into the atmosphere. It will be delivered to greenhouses and orangeries instead where this carbon will be utilized by plants in food carbohydrates, proteins, fats, vitamins and other living matter in the form of thousands of various organic compounds, which include in their composition the entire periodic table, the main share in which, by mass, falls precisely on carbon. It should be noted that greenhouses plants will absorb atmospheric CO₂, produce food and release additional oxygen for people nearby to breathe.

Furthermore, deep processing of some coals and shales will be carried out at relict solar biopower plants to obtain from them not only fertile humus but also synthetic fuels as well as a wide range of chemical products (aromatic hydrocarbons, oxygen and nitrogen compounds, alicyclic alcohols that have hydrogen-donating properties, etc.) and chemical elements, including gold (its content in shale is up to 40 g/t), elements of the platinum group, tungsten, molybdenum, rare, rare earth and other metals.

For example, some Russian coals contain, in grams per ton of coal: yttrium – 254, scandium – 96, dysprosium – 384, gadolinium – 335, samarium – 211, lanthanum – 46, cerium – 89, neodymium – 806, which is more than 2 kg of rare earth elements per ton of fossil fuels. Therefore, Russia's entire demand for rare earth metals (about 10,000 t/year) can be covered by processing only 5 mln tons of such coals. The entire world demand (about 200,000 t/year) can be covered by processing 100 mln tons, less than 1 % of coals and shales planned for use in such power plants.

Coals (shales) and the products of their combustion – flue gases, dust, ash, sludge, slag – will be used as raw materials for obtaining chemical products at biopower plants located in industrial clusters. Such technologies in the 21st century have already been created for a long time. At the same time, the lower the energy value of the used coals and shales (the higher their ash content), the more efficient and productive they will become from the standpoint of the production of fertile humus and a wide variety of chemical

elements, products and substances at biopower plants. Therefore, relict solar biopower plants operating on brown coals and oil shale will meet the future demand for these products of humankind on Earth for millennia to come.

By-Product of Relic Solar Bioenergy – Soil Fertility Improvement

The RSBE technology is completely biospheric, meaning environmentally friendly and waste-free. A power industry such as this will not kill living creatures; on the contrary, it will create and foster new lives with natural, not nature-like technologies.

About 450 tln tons of living humus with a moisture content of 50–60 % can be obtained from 300 tln tons of organic matter of shales. When about up to 10 % of humus (this is its average content in rich chernozems) is introduced into the upper fertile soil layer with a thickness of 30–40 cm, or approximately 30,000 t/km², it will be enough to transform 15 bln km² of area into chernozem agricultural lands. That amount exceeds the area of the earth's surface by approximately 100 times and the area of the entire surface of Earth by 29 times.

Thus, the terrestrial relict biosphere power industry could transform the planet's entire land into a blooming garden, planted on the most fertile and ideal soil for life, the rich chernozem. Even if the layer of chernozem reaches a meter or higher, this will not be hard to achieve. Such bioenergy will become actually free for humankind since the "waste" it produces – fertile humus, which will cost more than oil on the market and will pay off the production of electric and thermal energy.

The RSBE technology can produce more than 1.5 tons of humus from a ton of brown coal. One ton of humus would enable the growth of about a ton of organic food. Therefore, the annual production of 15–20 bln tons of brown coal and shale, which will be only 2–3 times as the level of their production by the end of the first quarter of the 21st century, will not only provide energy to 10 bln people (!) at the rate of 5 kW/person but nourish them with healthy and wholesome, even curative, food. Moreover, this will

stop the desertification of the planet and annually ramp up the production of nutrient-depleted and desert soils to the chernozem level on an area of more than 30 mln ha, which, for reference, exceeds the area of the most European countries.

The principal oil shale reserves are concentrated in the United States, accounting for more than 400 tln tons, from which more than 300 tln tons of humus can be produced (along with the generation of electrical and thermal energy). These reserves alone are enough to provide humanity with energy for thousands of years to come and turn the entire planet into a blooming garden several dozen times over with a layer of chernozem thicker than that currently existing in Ukraine. The cost of American shales as an energy resource and raw materials for the production of biohumus can be estimated at 3,000 tln USD at a minimum cost of 100 USD per ton, or 30,000 tln USD at 1,000 USD per ton.

Food Solar Bioenergy (FSBE)

Biofuels are various combustible products derived from raw plant materials, the main advantage of which is their renewability and that they require solar energy readily supplied to Earth. Therefore, using biofuels in transport, industry and power will not change the existing natural energy balance of the planet.

For example, with a sugar beet yield of 100 t/ha, grown on highly fertile soil enriched with biohumus, and sugar content of 18 %, the root crops planted on 1 ha of land can bring 10 tons of pure alcohol. Alcohol is an environmentally friendly fuel that is practically equal in its characteristics to natural gas and hydrogen. The additional upsides of alcohol-based energy are that it is less explosive, easy to store and use and more readily available.

The remaining 90 tons of raw beets from each hectare will be used for animal feed and humus, returning to the soil as organic fertilizer. Additional humus will not be required to restore the nutrients taken by beets from the soil that were used to obtain alcohol, since the plants take carbon, oxygen and hydrogen, forming part of alcohol, not from the soil humus but from the air (carbon dioxide) and soil water (for example, 100 tons of root crops contain about 70 tons of water).

To obtain 1 bln tons of alcohol annually (approximately the same amount of motor gasoline produced in the world in the 21st century) it would require 1 mln km² of sown land. This area is 21 times smaller than the planet's deserts, occupying 21 mln km², not including the polar deserts of Antarctica and the Arctic. By restoring the fertility only in these territories, humankind will be able to fill its need for environmentally friendly hydrocarbon fuel for millennia and provide food through the additional production of humus to billions of people and animals.

The 2 bln tons of dry residual organic waste created annually in alcohol production could become animal feed and biohumus in biopower plants. That's why living matter will return to the soil where, for example, sugar beets were grown, not only restoring but enriching the fecundity of this farmland, thanks to shales. This process is the real green solar bioenergy, not environmentally unsafe windmills and solar panels that produce only energy but nothing more and require a lot of nonrenewable resources for their production and ensuing disposal.

If 1 tln USD is invested annually in relict and food solar bioenergy, it would be about the same as in oil production and refining in the 21st century. This investment would provide energy to all of humanity. In addition, this would enable additional annual vegetation of an area of 330,000 km², equal to the size of a country like Vietnam. Note that such a biospheric-driven power industry could increase the total biomass of plants on the planet because they would grow where today's deserts are. Such a plan would not only increase the utilization of anthropogenic CO₂ by plants but also provide the additional production of food for humans and animals. Additionally, it would increase the production of oxygen by the biosphere, which is necessary for 10 bln air-breathing people and compensation for its withdrawal from the atmosphere by terrestrial industry, including relict bioenergy.

4.2.2. Agriculture

The total dry biomass of the biosphere is about 2.4 tln tons, of which over a trillion tons is carbon [74]. At the same time, the primary biomass

on the planet is green land plants, while all other living organisms (animals and microorganisms on land and in the ocean as well as aquatic plants) have a total mass of only 38–46 bln tons (less than 2%), counting the underground biomass located at depths of up to 5 km.

Contemporary humankind is about 350 mln tons of biomass in live weight (about 45 kg/person, including children), or about 100 mln tons in terms of dry biomass (about 13 kg/person), which is about 0.004% in comparison with the entire biomass of Earth.

The large biomass and variety of terrestrial living organisms are accounted for by humus, a complex organic matter due to which any soil becomes fertile. In the most fertile soils, chernozems, up to 10–15% is humus. The basis for producing organic food for humans is fertile soil.

An average person (considering all age groups) consumes about 700 kg of food per year, or about 150 kg of dry matter. Because of metabolism, each person excretes approximately the same amount of waste into the environment, primarily through their digestive system. Suppose this waste, converted into humus, is brought back into the same soil where the crops were grown. In that case, the natural circulation of living matter, disturbed in the 21st century by the humankind, will be restored.

Chaotic development of engineering in the field of agriculture made food to grow in one place, and waste to be generated in another, thousands of kilometers away. At the same time, the billions of tons of nutrients taken from fertile soil do not return in exact quantities. Mainly just three chemical elements (nitrogen, potassium, phosphorus) return to the ground, although plants, during their growth, take more than 80 elements from it. Moreover, simple and soluble industrial chemical fertilizers feed the soil of farmland instead of complex organic insoluble humates created by life, as it was during the previous hundreds of millions of years of the life evolution and the Earth's biosphere.

Agricultural Production

To make the substances, taken from the soil during the cultivation of agricultural products, returning, it is necessary to combine the zones

of their production and consumption spatially. Therefore, agriculture must be integrated into residential infrastructure or, conversely, residential infrastructure must be integrated into agricultural production. How to do it?

The roofs of houses (attic) can exist as glass greenhouses and as orangeries in hot climate countries. The basement could be used for growing mushrooms, breeding poultry, fish and seafood, both marine and freshwater, as well as other products for consumption. At the same time, an enclosed agricultural zone can be maintained commonly by a gardener and an agronomist hired by each household.

Microgreens and green food for the residents of these houses can be produced in greenhouses and orangeries, including equipped with humusoponic vertical farms. According to this technology, the root system of the plants receives a nutrient-rich solution, and shoots grow from planted seeds within 5–7 days. This technology is natural, in contrast to the conventional nature-like hydroponics based on chemical mineral substances, as evolutionarily plants feed on organic humus.

Humus – insoluble salts of humic acids stored in the soil – is converted into a soluble form by a community of thousands of species of aerobic and anaerobic soil microorganisms directly in the root system of plants. Therefore, agricultural farms integrated with a residential area can use humusoponics – according to this technology, plants feed on liquid humus, in which insoluble salts of humic acids have pre-converted into a dissolved form. By the time of publishing this text such experiments have been successfully implemented at the Unitsky's Farm Enterprise.

Microgreens grown on humusoponics are natural organic foods, originally rich in easily digestible nutrients and vitamins. Their cultivation technology has no industrial fertilizers or chemicals like pesticides, herbicides and GMOs. For example, in comparison with dry food for animals (mixed fodder, meadow hay) humusoponic fodder from wheat germs is better absorbed, more energy-intensive and contains 2–3 times more proteins and fats. At the same time, it exceeds dry food tenfold in terms of its content of carbohydrates, sugar and vitamins. It is also much healthier and more efficient

than fresh grass and hay. Unlike other forage eaten outside the pasture, this feed comes in the living form at the peak of its growth, preserving all the vitamins and digestive enzymes that animals need, especially in winter.

Another fundamental difference: the animal eats the aboveground part and the remnants of seeds with starch and the root, rich in sugars and proteins. Meanwhile, diverse organic waste materials can become a substrate: straws, press cake and even specially prepared wood chips, which microorganisms and plant roots convert, through fermentation, into easily digestible food. The result is balanced, complete and stable in its composition and quality fodder, ensuring the herbivorous animals get all the essential nutrients they need.

Regardless of the season and natural and climatic conditions (drought, torrential rains, heat and frosts), humusoponic installations will provide animals and people with fresh green food all year round, which is especially important in case of vitamin deficiency in winter.

Growing a ton of green forage requires about 2 tons of water, while the conventional field method requires 400 tons, i.e., 200 times greater. Moreover, for traditional cattle feed harvesting it takes about a hectare of land to feed one head of livestock. In contrast, the proposed technology of all-year-round vertical humusoponic farms, arranged, for example, in the semibasements of buildings and structures, requires about 1 m² of floor space, which is 10,000 times less. This comparison excludes (in 10,000 times larger natural areas) the mechanical tilling, fertilization, sowing, harvesting, transportation, drying, etc.

Year-round cultivation of agricultural products in greenhouses under protected ground conditions towards the end of the first quarter of the 21st century, for example, in the Netherlands, yields an average of up to 50 kg/m² per year. To sustain a family of five with fruits, vegetables, berries and herbs, up to 100 m² of area is enough. If greenhouses occupy the roofs, then each house could feed the family living there with plant food. In this case, such a house does not destroy natural soil, as it will be moved to the roof from under the foundation of the house, enriched with humus and become greener and more productive.



Meat and Biohumus Production

Let us consider the production of organic meat using the example of cattle since cows allegedly cause much more damage to the Earth's ecology than, for example, cars and airplanes combined. Experts made this conclusion from the Food and Agricultural Organization of the United Nations (FAO) [75]. According to the FAO, about 1.5 bln cows live on Earth in the 21st century, emitting 18 % of supposedly all 100 % of greenhouse gases, which exceeds the emissions of all transport on the planet.

Actually, this 18 % comes from 22 % of the greenhouse gases – carbon dioxide. That is, their effect is only $0.18 \times 22 \% = 4 \%$, since the leading greenhouse gases – water vapor – for some reason were not considered, although the significance of H₂O in creating the greenhouse effect in the Earth's atmosphere, as justified above, is 3.5 times higher than CO₂.

A cow eats about 20 tons of green fodder annually and produces roughly 20 tons of urine and manure. Hence, all 1.5 bln cows in the world will require about 30 bln tons of animal feed; they will provide 30 bln tons of manure, or in terms of dry matter – 3.5 bln tons, or 1/55 of the biomass produced by the biosphere.

The annually dying on the planet biomass, that same grass, regardless of whether cows ate it or not, would still require processing by the biosphere during one season into humus by the same microorganisms as in the stomachs of cows, with the release of the same associated gases, primarily methane and CO₂, and in the exact amounts.

So, cows in no way change the biosphere processes and do not harm Live Nature because the biosphere is utterly indifferent to where this organic matter, with the absorption of oxygen and the release of methane and CO₂, is processed, whether in the soil or the digestive system of an animal. At the same time, cows speed up processing organic matter into humus since this living biofactory turns dry grass into almost ready-made biohumus within a day. In the soil, these processes take several months.

Each cow produces several items, among which the surplus value of its biospheric waste – manure and urine as organic raw materials

to produce humus – is commensurate with the cost of milk and meat it produces. One cow can annually supply 100 kg of nitrogen, 50 kg of potassium and 140 kg of phosphorus as part of natural organic fertilizer with almost 100 % assimilation in soil [76]. In addition to replacing nutrients taken out by plants from the ground, all types of manure increase the proportion of humus in the soil and restore the fertile layer of any land.

Therefore, the vilification of organic beef in the works of some researchers, including under the auspices of the UN, is just a commissioned work to transfer human nutrition to synthetic meat in the interests of the producers of this dangerous food.

As mentioned earlier, 30 bln tons of manure, converted annually into fertile humus, for example, in relict solar biopower plants, will cost about 10 tln USD on the world market. However, these 30 bln tons of biohumus will make it possible to cultivate many organic agricultural products (primarily in linear cities) to feed more than 20 bln people – without using chemical fertilizers, pesticides and GMOs. This solution will solve the problem of hunger on our planet.

A car, on the other hand, does not produce anything useful except for transport services, while its industrial waste (exhaust gases, wear products of tires and asphalt, deicing salts, etc.) contains more than 100 carcinogens that can poison all life on the planet in territories exceeding, for example, an area of Great Britain several tenfold. Therefore, comparing a cow and a car from the standpoint of danger to the biospheric habitat is incorrect and sinful.

4.2.3. Transport

It has been repeatedly said that by the end of the first quarter of the 21st century transport became one of the main sources of environmental pollution of the planet. A significant part of the best plots of land on the planet is today paved over and “buried” under railway sleepers; it is equal to the area of five Great Britain [77]. The fertile soil adjacent to the roads is degraded on a more extensive territory by order of magnitude. Due to imperfect transport, about 1.5 mln people die on the roads every year, including postaccident deaths

in hospitals, and hundreds of millions, if not billions, of large and small animals; more than 10 mln people get into accidents, are injured, become disabled and are crippled.

If nothing changes, by the end of the 21st century, more than 100 mln people may die on roads, while about a billion will become disabled and crippled. Electric cars – a fashionable trend in transportation – will not necessarily save lives. On the contrary, they will likely kill and maim people on the roads.

Meanwhile, the travel speeds remain limited due to the technical imperfection of the transport systems that are widespread everywhere. Optimization of the global transport industry becomes a vital task. It can only be solved by engineering means. If the humanity starts with the recognition that engineering is the highest value, then constructors and designers should solve not only an improvement challenge for the existing transport but also a creation one for the optimal transport. To do this, it is necessary to understand the essence of such technological invention and bring its configuration to the verge of effectiveness in terms of the physics laws.

The bases of traction calculations for the movement of any vehicle are four main forces operating upon transport while in motion: aerodynamic resistance;

- 1) wheel rolling resistance (or other propulsion unit resistance);
- 2) ascending grade resistance on the upward route;
- 3) inertial forces.

Moreover, the first two forces are the major ones. The force of an automobile wheel rolling resistance mainly depends on the deformation of the tire and the road in the contact zone. However, already at a speed of 60–70 km/h the force of air resistance exceeds any other, and at a speed over 80–100 km/h it surpasses them all combined.

In the formula for calculating the air resistance force, only the speed is taken in the square. Thus, if the speed is doubled, the air resistance will be increased four times, if the speed is tripled, the resistance will be increased nine times, and so on. The energy consumption to overcome this resistance will also grow proportionally,

which becomes to be extremely significant and in fact makes it impractical for an ordinary car or train to travel at a speed over 120–150 km/h. Taking this into account, it turns out the improvement of high-speed ground transport is impossible without knowledge about aerodynamics.

Which item has the best wind shape? Everyone knows the answer to this question. A falling drop of water has the most acceptable shape (at the time of its formation, since then the drop is deformed during its fall) from the aerodynamic point of view. That is, a rounded front surface and a smoothly tapering long back.

Aerodynamic drag coefficient C_x is an experimental value. Numerically, it is equal to the force of air resistance in newtons that occurs at a flow velocity of 1 m/s per 1 m² of frontal area. It is customary to take a flat plate as a reference unit, for which $C_x = 1$. So, a drop of water has $C_x = 0.04$. Now imagine a car of this shape. Nonsense, isn't it? Not only such a thing on wheels looks somewhat cartoonish, this car will not be very convenient to use for its intended purpose. Therefore, designers are forced to find a compromise between the aerodynamics of the car and the convenience of its use. Constant attempts to reduce the coefficient of air resistance have led to the fact that for some cars $C_x = 0.25$ – 0.28 . High-speed cars can boast of $C_x = 0.2$. However, these indicators are still insufficient for cars to drive at a speed over 150 km/h in normal mode without enormous fuel consumption.

Any gas, including air, consists of molecules. They are in a constant motion and interaction with each other. And so-called van der Waals forces occur – the forces of mutual molecular attraction that prevent their displacement relative to each other. Some of them start to be attracted to the rest stronger. With an increase in the chaotic molecular motion, the effectiveness of one air layer impact on another also increases as well as its viscosity. Such a process occurs due to a rise in air temperature, and this can be caused both by direct heating from the sun or indirectly – from the air friction on any surface or simply its layers among themselves. In order to understand how this affects the car, just try to wave your hand with an open palm. If the stroke is slow, then nothing happens, but if it is stronger, the palm clearly perceives some resistance. This is just one component.



When air is directed over some stationary surface (for example, the body of a car), van der Waals forces contribute the nearest molecular layer sticking to it. This “stuck” layer slows down the next one. And so on, layer by layer, and the faster the air molecules move, the farther they are from a stationary surface. In the end, their speed is equalized with the speed of the main air flow. A layer in which particles move slowly is called a boundary layer, and it appears on any surface. The greater the value of the surface energy of the vehicle coating material, the stronger its surface interacts with the surrounding air and the more energy must be expended to overcome these forces. Now, based on the above, we can say that air resistance is not just wind hitting the windshield. This process has much more components.

Frontal resistance is up to 60 % of all losses. When moving, the vehicle compresses the air flow on it and expends the effort to push the air molecules apart. The result is a zone of high pressure. The most striking example of this effect can be observed in the subway while the train is approaching the station: the train, like a huge piston, squeezes a huge amount of air out of the tunnel, and at the very beginning of the platform anyone can feel the power of this flow.

Further, the air flows around the surface of the vehicle body, during which the air jets are separated with the formation of turbulences. The final stall of the air flow is stated at the car’s rear and creates a zone of low pressure. The resistance in the front and a suction effect at the car’s rear constitute a serious counteracting to the movement. This fact obliges designers and constructors to look for ways of body shaping that would cause the least disturbance of the air environment when the air flow vanishes.

The utmost influence on the overall aerodynamics of a high-speed train, as example, is exerted by the forebody. During experiments in a wind tunnel, it is concluded that for better aerodynamics, the forebody of a locomotive should be low, wide and should not have sharp corners. In this case, there is no airflow separation, which has a very beneficial effect on streamlining.

From the aerodynamic point of view, the side surfaces of the car, which has a small length compared to the train, influence the creation

of a vortex-free flow most of all. But they also should not be rounded too much, as this will lead to an increase in the cross section of the body (midship) and worsen its aerodynamics.

The rear of the vehicle also has a significant impact on the streamlining coefficient. The explanation is simple. Here the air flow breaks off and forms backwash. In order to avoid this, the back part tend to be made with a teardrop shape to minimize the effect of stall.

There is one more thing that significantly, at least twice, worsens the aerodynamic qualities of ground vehicles moving at a high speed – the airfoil effect.

The airfoil effect is the same air cushion used in the transport of the same name, but the air injection is formed not by special devices (for example, a propeller) but a dynamic air flow. Thus, the body of the car, when driving at a high speed, creates lifting force not only by reducing the pressure above the roof surface but also by increasing the pressure under the lower part of the body, which is fraught with separation from the roadway when driving. The manifestation of the airfoil effect can be regularly observed during the “24 Hours of Le Mans” motor racing.

To combat the airfoil effect, designers must increase downforce with the help of rear air spoiler, diffusers and fairings. Each aerodynamic element increases the midsection of the transport, which negatively affects the overall aerodynamic quality. It is a vicious circle.

Public transport has also picked up on the trend of reducing aerodynamic drag, making it faster and more efficient. Mallard steam locomotive No. 4468, built in Great Britain in 1938, had a maximum design speed of 203 km/h and was used in regular passenger service until the early 1960s.

Japanese Shinkansen (Jap. 新幹線 – new highway) high-speed rail network has been transporting passengers since 1964. The first trains reached speeds of 210 km/h in some sections. Later, it became possible to increase the speed up to 360 km/h. However, such high speeds are the exception, not the rule. These railway trains continue to experience the airfoil effect, which decreases the aerodynamic performance at least twice, and require a huge amount of energy for high-speed movement.



The impact of the airfoil effect is especially significant when using a monorail suspension scheme, for example, in the Transrapid train, which has the highest value of the aerodynamic drag coefficient C_x . This indicator at a high speed cannot be lower than 0.4 due to the presence of a so-called "skirt" enclosing the carrier beam and the velocity gradient in the air gap between the "skirt" and the fixed beam (not only from the top of the beam but also from its sides and the bottom). The minimum possible value of C_x for a module that is placed near the roadway (as a car) is 0.2 due to the airfoil effect created by the stationary roadway. The smallest value of C_x (0.05 and below) is for a virtual wingless drop-shaped module located above the ground at a height of 10 m or more. For a bus-sized vehicle (length, width and height) with a speed of 140 m/s (504 km/h), in the first case, the power of the aerodynamic drag will be more than 4,000 kW (the power of the main diesel locomotive), in the second case – 2,000 kW (the power of three tank engines), in the third – 500 kW (engine power of a high-speed passenger car).

As you can see, due to its configuration, which implies movement in close proximity to any surface (the airfoil can be not only the roadway but also the surface of the earth and the water), not a single mode of transport is able to get rid of the airfoil effect. For this reason, high-speed traffic for all existing types of land transport is either difficult or impossible. That is why airplanes are used for high-speed traffic – self-supporting vehicles that do not need a track structure, which are also expensive, inefficient and causing severe damage to nature.

It is possible to remove the airfoil effect by raising the vehicle above the ground. This, of course, does not entail a creation of one more obviously inefficient aircraft. Besides that, there are options.

So, an ordinary overpass raised above the ground is very material-intensive, expensive and, in addition, has a continuous roadbed. Therefore, even there the airfoil effect is not eliminated. However, this can be avoided by removing the continuous roadbed and leaving only narrow strips for the wheel movement. However, if the track structure is made continuous in length, without expansion joints,

then the carrying capacity of the overpass can be doubled. To exclude compression (for example, in hot weather) and loss of stability, the supporting structure of the overpass can be stretched in the longitudinal direction, i.e., it can be made as a prestressed one. Such variant of systems exists, in particular, in cableways, but there is no rail, and the wheel moves at a low speed (and with large energy losses) along the cable, which quickly wears out and becomes unusable.

That is why the main technological element in an optimized transport is a rail, in the core of which there is a bundle of bearing reinforcement (strings) stretched in the longitudinal direction. Such a rail allows not only to remove the airfoil effect but also to increase the bearing capacity of the supports on which it is mounted by eight times, since the supports are not cantilevered as in traditional bridges but are fixed at the ends – from the bottom (foundation) and from the top (track structure). This means that supports can be dozens of times cheaper, since the weight load from a light overpass (as an engineering bonus) will be an order of magnitude less than in traditional beam bridges. This solution seems to be optimal from both the minimizing aerodynamic resistance and reducing capital costs for road construction points of view, compared to all known alternatives for a track structure laying – an earthen embankment, a tunnel, a conventional beam overpass.

The described road configuration makes it possible to improve aerodynamics by using a rail car on steel wheels. Its drag coefficient has been reduced to 0.05 (for example, the most expensive and fastest Bugatti car has this coefficient of 0.38), which approaches the theoretical limit of 0.04. These results were obtained experimentally, by means of multiple blowdowns in a wind tunnel, and are patented.

It remained to solve the problem of overcoming the rolling resistance of the wheel, which consumes about 1/10 of the energy during high-speed movement (9/10 goes to aerodynamics). This solution was borrowed from railway transport, which uses the most efficient system for supporting the rolling stock on the track structure: "steel wheel – steel rail", where the efficiency factor is 99.8 %, since a force

of 2 kg can move a cart weighing a ton on a horizontal rail track. Losses in this case are by an order of magnitude less, and at high speeds they are even two orders of magnitude less than that of the “pneumatic tire – asphalt concrete canvas” system. And far less compared to other systems – air and magnetic cushion, not least because of the presence of the latter’s airfoil effect.

The described engineering goal-setting allows to create an optimal transport system. Its main elements:

- 1) continuous prestressed string rail overpass;
- 2) unpiloted rail vehicles on steel wheels, called uPods, are highly aerodynamic, equipped with an anti-derailment system and having an intelligent security, control, power supply and communication system.

The creators of all transport systems spread on Earth in the 21st century relied on the laws of nature, but their actions were spontaneous in terms of goal-setting. As far as it is known, none of them set themselves a large-scale task. They were designing, for example, the best sports car or the most advanced fifth generation fighter jet. No one tried to create a fundamentally new system, or rather a transport and infrastructure complex, including more than a dozen systems and subsystems (rolling stock, track structure, power supply system, automated control and communication system, logistic infrastructure, etc.), optimized from the standpoint of physics (mechanics, aerodynamics, energy, strength of materials, tribology, etc.), which could become the basis for transportation on a global scale. Namely, the scale in the assessment of transport is a decisive factor. One car is probably good. But 2 bln cars predicted by 2035 is a disaster. One plane is great. But hundreds of thousands are so bad that the governments of some countries are even forced to introduce an environmental tax. Therefore, the main requirement for ideal transport is the ability to transport many people and goods quickly, efficiently, comfortably and affordably (spatially and financially) without harming the environment, primarily living, of which people are a part (but not an artificial intelligence, as example).



Engineering optimization, possible in a situation where engineering becomes a value, allows to create not only the most efficient but also the safest and most environmentally friendly transport.

If during the 21st century all transport will become overpass and string rail then land users on the planet will be returned territories equal to six Republics of Belarus, previously occupied solely by motor roads [77]. The liberated lands can be made fertile again. It will require about 25 bln tons of living humus, allowing enriched soil to produce about 1 bln tons of agricultural products annually (about 100 kg/person). In addition, the greenery will enable oxygen production and capture atmospheric carbon dioxide at about a ton of CO₂ from a hectare daily [78].

Building a network with its overpass prestressed track structure on the second level will reduce pointed earthwork by more than 100 times compared to laying the same roads in a linear embankment. In addition, savings on the road network of 25 mln km will amount to more than 1 tln tons of soil, and it should not have to be brought from the tens of kilometers far away the quarries as well as there will not be any need to dig them. Consequently, the natural landscape and biogeocenosis will not suffer any significant damage, and land reclamation will be unnecessary in the construction zones as well as in the ground and the sand mines. This part is crucial when passing the route on permafrost soils that cannot withstand the additional load from the embankment weight and higher temperature loads in summer.

There will be no embankments and dugouts here, sometimes reaching 10 m or more, like the modern roads and railways have. Such structures will not disrupt the migration of domestic and wild animals, will not depress natural biodiversity and will not hinder the movement of agricultural and other equipment. Furthermore, there will be no swampy or deserted vast territories along the second level tracks, especially on rough terrains, since each roadbed is a low-pressure earth dam that interferes with surface and groundwater movement. The soil in it should compact only 10 % compared to the natural occurrence. There will be no need for water release structures, bridges, overpasses or multilevel interchanges.

In the 21st century, introduction of new technologies into transport can save about 100 mln people from death in car accidents and about a billion people from injuries and traumas. At the same time, overpass prestressed tracks will not kill trillions of large and small animals as they will not trap under the wheels since it is the second level transport. The wars continuously going on the planet claim fewer lives and maim less people as well as animals – large and small, domestic and wild.

In addition, land users of the planet will get back more than 1 mln km² of soils that are “rolled up” in asphalt and “buried” under rail sleepers today. Significantly larger land areas on all continents will not continue to degrade due to the proximity to motor roads and railways.

The unpiloted vehicles on steel wheels moving above the ground are characterized by unprecedented efficiency. So, compared to the Tesla electric car with pneumatic tires, their efficiency is 5–7 times higher. This indicator is also due to the absence of an airfoil effect. This aspect alone improves the aerodynamic drag of uPods by 2–2.5 times [77].

The described advantages are especially noticeable for large-scale communications. For example, about 10 mln high-speed uPods will run on the routes of linear cities with an average capacity of 40 passengers. That equals 3–5 passengers for family cars to 150–250 passengers for trains. (For comparison, by the moment of publishing this text, the world’s car fleet alone is greater in 150 times, which is approximately 1.5 bln units.)

Steel wheels, unique aerodynamics and the absence of an airfoil effect reduce the power of resistance to movement at a speed of 500 km/h by an average of 2,500 kW per one vehicle [77], which will save up to 25 bln kW for the mentioned car fleet. With a utilization rate of 0.75 (18 h of operation per day), these parameters will save about 40 bln tons of fuel annually, worth about 40 tln USD. In addition, approximately 120 bln tons of oxygen will not be burned out of the planet’s atmosphere yearly, including that in thermal power plants that generate energy for electric transport. Plus, almost 200 bln tons of exhaust and flue gases will not enter the atmosphere.



This is the real, and not declarative, saving of resources in the 21st century (and only in relation to the high-speed component of the global transport and communications industry):

- steel – savings of 250 bln tons;
- reinforced concrete – savings of 3 tln tons;
- exhaustible mineral raw materials – savings of more than 3 tln tons;
- soil (including fertile soil) – savings of 1 tln tons;
- fuel – annual savings of 40 bln tons;
- atmospheric oxygen – annual savings of 120 bln tons;
- environmental resource – the absence of annual emissions into the biosphere of about 400 bln tons of solid and gaseous technogenic wastes, including gases from exhaust and flues.

The cost of saved resources at about 1,000 tln USD. No less valuable will be the billions of people's and animals' lives saved in the 21st century and about 1 mln km² of territory returned to the true landowner, the biosphere. It is also essential that it will not contain about 400 bln tons of fuel combustion products and technogenic pollution.

4.2.4. Residential and Industrial Infrastructure

Both the early 21st century cities layout and the logistics in them as well as buildings and structures do not respond to the requirements of a safe, sustainable and comfortable living for residents. Cities on the planet were built and developed spontaneously. First, hundreds and thousands of years ago, footpaths were made between certain dwellings by walking and then paved with cobblestone, along which horse-drawn city transport began to move. Then asphalt was laid on the cobblestones for the cars to drive. Later, skyscrapers were built around the asphalt. This was how megacities emerged where the life had become impossible.

The historically formed infrastructure of habitation was built not for people but for cars, primarily for road transport, which today counts more than a billion passenger cars alone. This includes traffic jams, smog, noise pollution, dirty air, soil saturated with hundreds

of carcinogens, exhaust gases, anti-icing agents and tire and asphalt wear products. The streets, backyards, surface, overland, underground garages and car parks are packed with millions of vehicles.

Cities on the planet have occupied vast territories, and what is more, they use the best lands. These lands have been withdrawn from biospheric life cycles because buildings, structures, city roads and infrastructure occupy them. For example, China's world's largest city, Chongqing (82,400 km²), is practically equal in area to a country like Austria (83,800 km²).

Linear cities harmoniously blend with the environment of any natural and climatic zone on the planet can become an alternative to the 21st century megacities [79, 80]. They will not take away the fertile land for construction, moreover, they create more. The cities will have everything they need: clean energy, organic food and artesian spring water. In the 21st century such cities will help deserts disappear from the planet, transforming Earth into blooming garden where all humanity will live and work safely and comfortably.

Placing linear cities at least 10 m above the current ocean level is more reasonable. If it rises in the future, in hundreds of years, through a natural cyclical global warming or warming caused by human activity, the ocean will not flood these settlements.

The linear city will be made of pedestrian clusters connected by the urban electric second level communicator moving at a speed up to 150 km/h as the safest, most energy-efficient and environmentally friendly type of passenger and cargo transportation [81].

The transport and communication corridor of about 100 m wide will be passing through the linear city or parallel to it – the high-speed air routes of string transport (speed up to 500–600 km/h), hyper-velocity routes located in forevacuum tunnels (speed up to 1,200–1,500 km/h) and cargo systems [77]. To ensure comfortable movement, in which centrifugal accelerations should be below 1 m/s², the radii of curves on vertical and horizontal routes at a speed of 500–600 km/h should be at least 20–25 km, and for 1,200–1,500 km/h – at least 120–150 km. Hence, the linear city can be winding, but high-speed routes must be as straight as possible.



With an average population density in a linear city of 2,000 people/km, to accommodate 10 bln people, the total length of cities, built along the communication network and combined with relict solar biopower plants, power transmission and communication lines, would be 5 mln km. Then the network of linear cities will occupy an area of about 5 mln km², or 1/27 of the Earth's land, excluding the continent of Antarctica. The remaining 26/27 of land can be allocated for national parks, reserves, wildlife sanctuaries and reservations with sparing land tenure systems [82].

The area of deserts on the planet, excluding the polar deserts of Antarctica and the Arctic, is four times greater [83]. Therefore, if the deserts were made green and fertile and linear cities were built only there, 40 bln people would be able to live in them, and they would be supplied with everything they need: housing, food, drinking water, energy, transport, work, rest and recreation. It would be easier and cheaper to do this than, after having finally exhausted, polluted and ruined our native planet, to fly to a distant, cold and alien Mars to lead a wretched existence in spacesuits, without organic food and fresh air and water.

Linear cities will occupy the land nominally, since gardens will grow on the roofs of all buildings and constructions (in greenhouses and orangeries). Thus, natural biogeocenoses and biospheric ecosystems will be created – even in the place of deserts and permafrost.

The total length of the network, counting the transverse lines and the second level roads entering protected natural areas and natural resource deposits, will then amount to approximately 10 mln km (for comparison, the total length of the world network of all types of roads is currently more than 60 mln km) [84].

Near the residential clusters, along or across the linear city, there will be infrastructural clusters with other functions: scientific, educational, industrial, sports, shopping, entertainment, recreational and more. To improve the logistics and maintenance of production facilities, including the relict solar biopower plants with a large volume of freight traffic of raw materials and humus, infrastructure clusters may be located outside the residential area – in the area of the transport and communication corridor. The required volume of transportation through the cargo component of the global

network is about 10 bln tons of shale and brown coal per year and about the same amount of fertile humus.

In the linear city, the average speed of public urban transport, rail electric vehicles on steel wheels, will be 60–80 km/h and more, that is, for example, higher than in Moscow tube. With no traffic obstacles, such as intersections and pedestrian crossings, cars, trams, buses, snow or sand drifts or puddles on the roadway, it will be the safest and by order of magnitude faster urban public transport in the world. For example, the fastest urban transport of the first quarter of the 21st century is in Berlin, where its average speed is 6.5 km/h (for comparison: in Washington – only 2.8 km/h) [85].

The overpass transport with a prestressed sagging track structure can become the most energy-efficient type of urban road out of all theoretically possible ones, since it automatically recovers energy when moving from station to station. When leaving the station, the uPod, moving downhill, accelerates to the rated speed (for example, 100 km/h in the middle of a span) only due to gravity and without using engine. In the second half of the way, moving upward, cabin is decelerated by gravity without using brakes.

In such operation system, similar to the pendulum swings, the potential energy is automatically converted into kinetic energy and vice versa under the laws of physics and not with the help of mechanical recuperates, which, as a rule, have a low efficiency factor. Energy is needed here only to overcome aerodynamic drag and steel wheel's rolling resistance, which is about 5–7 times less than is required when the traditional urban modes of transport, like buses, trams and trains, move along a horizontal track. Therefore, to perform similar transportation work, the network of string urban routes located at the second level will require 5–7 times less energy than an ordinary urban transport network at the first level of the same length and capacity.

The track structure of transport systems of linear cities can be designed in such a way that electrical and information networks will be embedded into it, providing electricity and communication for both the clusters and the linear city as a whole with the entire infrastructure: social and cultural, shopping and entertainment, scientific and industrial and others.

Each cluster will have one or several relict solar biopower plants with a total capacity of 5,000–10,000 kW (depending on the number of cluster residents) located outside the residential area and producing up to 50,000 tons of fertile humus over a year. This would enable, for example, annually transforming up to 1 km² of the desert into fertile land such as chernozem. Therefore, in 50 years of operation, the worldwide linear city will be able to increase soil fertility to the level of rich chernozem on the entire Earth's land, including mountains and deserts.

The cluster, with an area of 1–2 km², with dimensions of about 1–1.5 km, is planned to be constructed as a pedestrian urban-type settlement. It will comfortably accommodate from 2,000–3,000 people (based on 500 m²/person, or 25 ares for an average family of five) to 7,000–10,000 people (200 m²/person, or 10 ares per family). With minor changes, the cluster can be erected on the sea shelf or open sea, if the buildings and structures are buoyant.

The dimensions of the clusters are conditioned upon the need to connect their centers with each other by the urban overpass tracks of a sagging type with one span without supporting towers. It is known, that frequent stops for urban transport less than 1 km apart significantly reduce the average travel speed and lead to an increase in trip duration. And in a linear city on spans longer than 1.5 km, the track structure will sag excessively under its weight and the weight of the rolling stock, requiring passenger stations to be located at height of 50 m or more. Therefore, the dimensions of the cluster in plain view and the length of spans of 1–1.5 km are ideal from the viewpoint of pedestrian and urban transport logistics as well as technical and economic indicators.

The residential area will appear as blocks, separated by a green strip 100–200 m wide, with common spaces for the cluster residents and guests: leisure and sports areas, public buildings, sports stadiums, a health center, a medical station, shops, cafes, workshops, a kindergarten, a school and other amenities.

In the center of the cluster, there will be a dominant building with a passenger station on one of the floors or the roof, within walking distance. Reaching it from any point of the cluster takes less than 10 min.

In the center of the green strip at the height of more than 10 m, there will be a track structure that is visually light and delicate, even casting no shadow, which, with the same capacity, will be at least 10 times cheaper than a traditional underground metro.

Silently moving along air rails, there will be the rolling stock of high-speed sky metro – unpiloted rail electric vehicles on steel wheels, which are at least three times more power-efficient, i.e., greener than a traditional electric car. The height of the safe movement of suspended uPods at the lowest point of the track, in the middle of the sagging span, namely in the interval between adjacent clusters, will be no less than 6 m to their bottom.

Residential buildings will be united as a single architectural and functional system, like a “horizontal skyscraper” multi-apartment, or a high-rise building lying on its side. The “skyscraper’s” dimensions, including its length, can vary over a wide range, from 100 m to 1 km. Each house would need a living area of 100–300 m² to accommodate an average family of five. The homes will have two or three floors: a semibasement, a living floor and an attic.

For thermal insulation, the buildings are more expedient to carry out frame with panels made of vacuum glass – the thermal insulation properties of such panels with a thickness of 20 mm are equivalent to a brick wall with a thickness of 1.5 m. If necessary, the panels could be transformed into electronic screens to display images. The primary construction material is sand, which is enough on the planet for trillions of such “skyscrapers”.

In terms of energy efficiency, each “horizontal skyscraper” in the cluster will be designed as a “energy-plus house”, according to the European classification. When a house like this includes all the utility equipment (solar panels, collectors, heat pumps and recuperates), it generates more energy than it consumes.

Conventional roads in the cluster will be green, made of aerated concrete with grass, combined with pedestrian and bicycle paths and suitable for light electric vehicles. In addition, provisions will exist for heavier traditional vehicles, such as ambulances, fire engines and farming equipment. The same goes for dirt roads with grass embankments between the houses to access each household plot.



Therefore, each cluster is a self-sufficient urban-type settlement, although according to its living arrangement it is more likely to belong to rural settlements. It will be provided with everything of its own production, including food, water, energy, transport. And it guarantees food, energy, environmental, infrastructural, social and other security of the linear city even during pandemics, lockdowns or other natural and human-made disasters.

Optimization of urban planning constructions, buildings, structures and infrastructure (“linear skyscrapers”, roads on the first and second levels, adjacent territories and common land plots, engineering networks, landscaping, etc.) will reduce the cost of housing and living in a linear city by 2–3 times that of conventional urban development while improving the quality of the living environment and the standard of living of urban residents.

4.3. Rules for Life of the New Engineering World

A fundamentally new infrastructure of settlement, living, working and recreation of people in linear cities, dovetailed with terrestrial nature, without violating its local and global biogeocenoses that have developed over millions of years of evolution, enables us to look differently at societies historically formed on the planet that are part of the structure of our modern technogenic human civilization.

After inventing the first machine as the servant, human socially mutated over the generations and became the invention’s servant and eventually its slave.

We cannot imagine life in the 21st century without a smartphone and a car, and we care about them more than about our health. For example, the creation and implementation of the iPhone and MacBook technologies were more important to Steve Jobs than the functioning of his pancreas, from cancer of which he died at the age of 56.

After all, we do not put our smartphone in the microwave for a night because we realize it will quickly fail to function, although we can put it next to our pillow, closer to our brain. And we can even build a house under a high-voltage power line and easily cross it dozens of times daily.

We are afraid of high voltage in the socket. Still, we do not attach importance to getting electric shocks from a doorknob because we are dressed and booted in an electrified insulator. However, our ancestors walked barefoot and had the electrical potential of Earth. People are not bothered by sparks flying when we comb our hair, which speaks of a high, about 100,000 V, electrical voltage around our head. However, we know that our nervous system and brain are super-complex low-voltage networks that exchange weak electrical impulses sensitive to external electric and electromagnetic fields.

We are afraid to walk up to the verge of the roof of a 20-story building but not scared of the collision with an oncoming car at a speed of 70 km/h, although hitting the ground after falling from a height of 80 m will happen at the same relative rate.

We, humans, keep moving further away from the Live Nature that gave birth to us into the inanimate world of machines, devices and artificial intelligence. We are happy when our five-year-old child is confident with a computer but are not upset when they think that bread grows on trees, like apples, and sausage is grown in seedbeds, like radishes.

Four sectoral industrial technologies drive the technocratic development vector of our civilization – agriculture (food sector), transport and communications (communications sector), power industry (industrial opportunities), the infrastructure of living, production and work (habitat). It is going down a blind alley due to the imperfection of these outdated and almost ancient technologies that do not meet the civilizational requirements even of today, let alone the future. Under the guise of global warming, deindustrialization, decarbonization and other global problems of our time, there is an attempt to zero out the civilizational settings and break the existing industrial civilization code.

It is well known that the solution to any complex issues should always be sought at a higher level of understanding.

The leading causes of the global problems of our time are the activities of humankind on the platform of the mind. For these difficulties to become a thing of the past, every human and humanity needs to rise to a new macrolevel, the level of reason.

Only our ability to reason distinguishes us from animals on a system level. Animals have intelligence, but they cannot form reason. The mind is responsible for food, procreation and other bodily needs required for survival. Therefore, even the coronavirus is smart enough not to set a goal of annihilating its habitat, the human body, where it settles.

Our ability to reason is responsible for spirituality, self-knowledge, self-development, human feelings and emotions, morality, ethics, art, culture, improving relations with others and the surrounding nature and other spiritual values, including engineering as a form of practically oriented art.

Only the presence of reason makes a human a social person. Concepts such as “society”, “sociality” and “socialization” have very similar meanings. All these concepts can be replaced by two simple and familiar to everyone words: human relations.

The presence of reason enables us to consciously improve and develop our relationships with other people, the surrounding nature and with the entire Universe as a whole. It manifests itself in every person as spirituality and conscience. According to all spiritual, philosophical and religious teachings, everyone should improve and develop themselves, building elevated relationships at all levels. For this, nature gave reason to humans.

While possessing both mind and reason, human has become binary: he is both a social person and, simultaneously, an individual one.

Individual means intelligent, while social means reasonable. The more reasoning a person does, the higher the spirituality is and the better the human builds relationships with others, the surrounding world and nature in all its manifestations.

With the development of industrial technologies in a consumer society, created in the era of capitalism and oriented just on getting profits, aimed at satisfying bodily and mental needs and pleasures. At the same time, we pay less attention to improving the inner people’s world, the level and quality of their relations with one another and the outside world. And the less humaneness remains in people, the more inhumane offenses they commit and the more chaos they bring to our world, destroying Live Nature.

The technogenic civilization created by people is a civilization of knowledgeable but very unreasonable people. Modern humans have begun to value individual comfort much more than interpersonal relationships. Such people are, by contemporary medicine standards, “mentally unsound”.

The wider the gap a person has between mind and reason, the worse it turns out for the individual and the spiritual environment of the habitat – society. And, vice versa, the more conscious the relationships between people in the community are, the faster they and society succeed in all areas of their activities with significantly less effort and resources. This point is where the rationality of everyone should manifest in the realization that their main personal benefit is the spiritual development and the development of social and interpersonal relations not only with other people but with the surrounding world.

The actual progress of our technogenic civilization, built on engineering and scientific technologies and discoveries, should consist not so much in the development and improvement of industrial achievements as in the progress of humaneness in people making up our terrestrial and precisely human civilization and not any other (dolphins, ants, bees, etc.). The time has come to build a society consisting not so much of intelligent techno-consumers as of socially reasonable people, for which they need to learn how to create and make social inventions and discoveries, along with technical ones. Technogenic civilization must be replaced by engineering civilization.

Humaneness is a cultural, moral and community-social state of an individual, the development of their mind and acquisition of full-fledged morality and ethics of interpersonal relations, conscious responsibility and a holistic understanding of real life on Earth, in the biosphere of which there are billions of species of living beings inhabiting a shared planet that is but a speck of dust in the infinite Universe.

Humaneness and spirituality reveal the fullness of each person’s nature, unique abilities and talents. By developing these qualities in oneself, one begins to feel the fullness and wealth of the Earth’s life – one’s own and that of society created together with the likes of oneself.

The completeness of morality is when it is not only our life that we want to make happy, versatile and high-quality but the lives of our relatives and friends, based on the logic of the “Six handshakes rule”, out of love for them, relying not on self-interest but on higher order values.

Conscious responsibility is when we take personal responsibility not only for our life and health (physical, spiritual and moral) but for the health and life of our loved ones, humanity and the whole planet and do not shift this responsibility onto others.

The integrity of understanding is when we consciously develop our reason towards understanding how the natural, not virtual and digital, world around us works and functions and the meaning of each life and its purpose.

The deeper and wider a human reveals one’s individuality and hidden talents, the wealthier, better and more interesting one’s relationships with others will become. The divine principle of unity in diversity put in by nature is possible only with the disclosure of people’s essence, which will only enhance and increase their enjoyment of life and relationships with one another.

The more femininity in women and masculine qualities in men, the more attractive they will become to each other and the more powerful and stable their family unions will be. Here lies the divine wisdom so that life should not degenerate but develop eternally from the simple to more perfect, sublime and higher quality. Specifically, sociality and interpersonal relations enabled several thousand primitive people to create their first engineering technologies and, over several thousand years of evolution of engineering creativity, to develop into a modern technogenic mega-society – multibillion humanity. However, in this process a gap appeared between morality and engineering, which must be eliminated through an appeal to reason and giving it a system-forming status.

Reason, like life itself, has an anti-entropic nature, meaning that it always strives to increase and arrange knowledge, to understand the essence of the Universe and in its highest manifestation to comprehend the divinity of Live Nature and to restore the material and mental relations and connections with it that

the techno-consumer has lost during the development of industrial technologies.

Human, as an entropic matter, is doomed to decay. Human's intellect and ability to reason is an anti-entropic tool, the purpose of which is to elevate the nonmaterial component of the personality – spirituality. Human develops the individual and, accordingly, collective reason only when, relying on personal talents and experience, brings benefits not so much to individual targets as to those that are common; this is the essence of the concept of human humaneness.

Based on all existing religions, the goal of anyone's life is to be able to reveal all the best in themselves and to be reunited with the Universe that created them. Therefore, the main goal of the leadership of each state is to help people living there to achieve that. Such is the social and spiritual responsibility to society.

People on the platform of the mind become individualists and morally degraded due to the wrong priorities and goals of the consumer society imposed upon them by the media working for the highly secretive interests of the global businesses that created them.

In the current reference frame, economic growth and GDP are determinants for all states, not the development of a country's citizens as spiritual people. The actual priorities should be different. There is a well-known saying: do not put the cart before the horse. Material well-being is the cart, while the development of human qualities in a person is the horse of civilizational progress. Correct and safe onward movement is when the horse is harnessed to the cart, not vice versa.

If people switch from an economic frame of reference – from a consumer society – to a social coordinate system that stimulates the development of their human qualities and reason, then our civilization, realizing itself not as technogenic but as engineering one (i.e., based not on technology but on creative potential inherent in the essence of engineering activity) will be developing much faster, more confidently and more sustainably.

Our priority should be living in a society of humanity, spirituality and morality, not the desire to become a slave of the rapidly created dead, soulless and impersonal artificial intelligence, which will control

our bodies and souls based on primitive binary and virtual mathematical codes. There is no need for rose-colored glasses to see why this is happening; it is to obtain enormous profits for those who promote this same vector of civilizational development.

Where the bow of the ship points, the ship will sail along that course. Therefore, the state should focus on developing morality, spirituality and humanity in people. Then it will be assessed upon indications featuring the level and quality of human relations. Accordingly, we can focus all public institutions on improving these indicators.

Today, heads of state are like principals of trendy schools who assess the situation only by technical improvements in their educational institutions. Notably, the educational process itself at school needs to be improved. So, what are children taught? And are they taught anything necessary, meaningful and valuable? What is the use of the fact that the school is equipped with the latest technology and looks good on the outside when the pupils there, oblivious of their lessons, ferociously fight with one another and class on class and can even kill each other in the heat of the moment? We see it happening now everywhere on our planet, divided, like a patchwork quilt, between 245 states and dependent territories.

The level of development of people's reason, morality and responsibility determines the quality of their relationship. Therefore, a state should not be assessed by the GDP growth rate, as it is common in the age of full-fledged capitalism, but by such factors as the crime level, the scale corruption; the number of depression, stress, conflicts; cases of domestic violence, mental and other diseases, divorces, abortions, suicides; the number of unemployed and homeless people; the number of single parent or incomplete families, children raised by stepparents and older adults left without the support of their children.

Among the positive factors are birth rate and the level of education and morality; the number of registered family unions and orderly families, gold and diamond weddings; the number of healthy (physically, morally and spiritually) people leading a healthy and moral lifestyle; the duration and quality of life of each person and society as a whole;

attitude towards friends and family and the outside world; the amount of preserved and augmented biosphere resources.

The main task of the education system will be fostering children's high qualities and pursuit of moral and spiritual development. Cinema, television and mass media should not advertise "chewing gum and popcorn" for the prosperity of yet another business but spread something more elevated and significant: morality and ethics, co-creation and a culture of communication aimed at strengthening the family and encouraging people to show their best human qualities in all structures of society, starting at the family and rising to the state and civilization level.

In the 21st century, society is focused on profit, which develops individualism and the "take it" vector in people. In contrast, commitment to the ideology of morality and humanity extends in people the will to share something meaningful and worthy with others. Resetting society to the moral vector of development will entail economic growth because where people care for each other's welfare, security and stability will rise, labor efficiency and productivity will increase while living and operating costs and expenses will drop.

The criterion of efficiency and the level of civilization of society and an individual will not be profit but the common good, which will turn the techno-consumer humanity into engineering, socio-technocratic one. Labor will become the central element of creation and creativity rather than a mechanism for a person to survive in society and civilization on the planet.

Such a development course can bring the world community during the 21st century to harmony and prosperity. Without reducing population and without deindustrialization, as exactly the engineering technologies increased the quality and a standard of life: from the primitive existence of caveman to the current civilizational level, with the simultaneous growth of a small population of two-legged and upright walking semi-animal individuals to billions of reasoned and spiritual individuals.

By the end of the first quarter of the 21st century human civilization has entered a regime of turbulence and instability due to the rapid development of engineering technologies and against the backdrop

of underdeveloped moral and ideological platforms. Attempts to create new totalitarian sociopolitical and economic-technocratic global international systems will inevitably arise on the ruins of old philosophies and ideologies. To prevent these attempts, one needs to be aware of their symptoms.

These destructive systems block and suppress the development of morality and the manifestation of humanity in people; they do not allow us to find, reveal and realize the amplitude of our human qualities. Social and educational stratification and restriction of knowledge limit the development of human reasoning, including reducing it to piecewise knowledge. For example, some children are educated more about one subject or another but not on the amplitude of knowledge about the surrounding world's diversity and that everything is connected. Moreover, the education system is perverted: children learn to become consumers and lay people rather than social personalities and creators.

Deterioration of morality begins in childhood and is implemented by focusing people's consciousness on bodily needs. However, spiritual needs mainly come down to entertainment and virtual games, most of them being trivial and primitive "shooters" in which you need to wipe out as much and many of something and someone as possible or destroy and kill in the most sophisticated manner. From early childhood, this forms a person's individualism and consumer attitude to life, each other and the entire Universe as a whole, leading ultimately to the disintegration of individuals, societies and countries, to environmental and manufactured disasters, economic and sociopolitical crises.

The destruction of traditional morals, which have formed in society over millennia, occurs, among other things, through the damage of the institution of the traditional family as well as through the deprivation of parental rights and committing children to the care of a depersonalized and soulless state or third-party or alien and strange individuals and organizations.

People's sense of responsibility gets blocked through the stratification of society, through the systemic subordination of people to the hastily created impersonal, asexual and unfeeling artificial

intelligence as well as through restriction of social rights and freedoms of the human person, which has a nature-given living body, life-creating gender and living soul.

The planetary consumer society, a contemporary technogenic civilization, created over the last 200 years of capitalism (starting with the George Stephenson railway), now resembles reasonless mold in a Petri dish devouring limited resources, polluting the space around it and inevitably perishing.

Responsibility can develop in every person only in the space of freedom. The less genuine freedom people have, for instance, the more the application of protective masks on their faces, the more vaccines and microchips they receive, the more often they hide in lockdowns, the less responsible and free they become. Step by step, they turn into cyborgs, digitalized bioconvergents.

A hindrance to the development of every individuality is also the one-size-fits-all approach to assessing the usefulness of their work for society. For example, this was the case in the late Soviet Union – the same income level for all employees, regardless of the volume or existence of the profit they may bring.

Another formidable barrier to discovering the talents inherent in each person is all types of stratification of society, with the absence of individual means of social mobility.

For artificial intelligence not to turn humanity into an obedient herd of zombified enslaved people, a social and moral transformation of our civilization's technogenic vector of development is necessary, which translates into the progress of human relations, morality, ethics and humanity in people. And all this must exist spiritually for the Earth's society to become a civilization of reasonable people.

It is necessary to start such a civilizational reboot with specific steps: with the construction of the first targeted projects on a fundamentally new planetary eco-infrastructure, such as the string rail second level transport, linear ecocities at the first level and relict solar ecobiopower plants, whose industrial waste will be fertile humus and, accordingly, apples and grapes.

Proximity to the earth in a linear city would enable one to return to the origins – to Live Nature, whose part one forms and from which

one becomes distant, having believed in the idol of scientific and technological progress.

At birth, we receive a body, the only thing at our disposal until the end of our days. Therefore, we must love our body so that it should serve us as long as possible. Food is the primary raw material for constructing cells, organs, systems and the whole organism. A lifestyle that provides bodily contact with nature is also important. All this is achievable with the organization of settlement in linear cities. Here it will become possible:

1) to walk barefoot on the healing morning dew every day and get up at the crack of dawn;

2) not to fear for the lives of one's children playing on the grass, not asphalt – they will not get run over because there are no cars;

3) to eat only natural organic food, which is healing and gives us health, well-being, endurance, high efficiency and longevity. Such natural food strengthens the immune system and prolongs our life up to 100 years or more, and it is irreplaceable by any of the most innovative and expensive biologically active dietary supplements, medicines, vaccines, vaccinations and procedures;

4) to breathe freely clean life-giving air, replete with phytoncides of healing field and forest flowers, herbs and trees;

5) to drink living spring (artesian) water, adequately sourced from the required deep aquifer within one's own or neighboring residential cluster without deterioration of its properties and quality;

6) to have one's favorite occupation in one's house or next to it, in one's own or a neighboring cluster, and not waste hours of precious spare time on uncomfortable, unsafe and not free of charge transport to get to work and back home every day. Walking to work will become the norm; based on physiology, walking at least 10,000 daily steps is advisable to invigorate the whole body. Such health-promoting physical treatment is beneficial at any age and has practically no contraindications;

7) to communicate with Live Nature and strengthen the body and spirit with productive physical activities. Regular activity is indispensable for our body, consisting of many moving elements –

850 muscles, 208 bones and 360 joints. Such daily practical physical activity on one's land, not in the gym, is vital for us, above all for the lymphatic system, which is the body's internal environment and is the basis of our immunity and health. Lymph consists of intercellular fluid and is the "gullet", "water pipe" and "sewerage" for every cell of our body; there are about 40 tln of them. This liquid does not have a heart of its own; therefore, the constant contraction of every one of our muscles is necessary for circulation through the lymphatic capillaries without the formation of zones of stagnation in all of the above moving elements of the human body and the diseases it causes, including cancer;

8) to get their primary life profession for each resident of a linear city – a happy person, which means he will become wealthy by creating in themselves the most outstanding human values: health (physical, spiritual and moral), longevity and soul profusion.

Clusters of linear cities will become the primary platform for the self-organization of communities for survival in today's fierce global competition, with a decrease in the role and importance of state borders as some socio-economic regulators.

Psychologically, a person continually strives to find support and mutual understanding among a community of people close to them in spirit and way of life. It is not enough to feel oneself just a member of society and a citizen of one's country. A modern person, tired of constant pressure from the authorities, politicians, businesses and advertising, vitally needs a kind of safety valve: understanding and solidarity, involvement without reaping benefits and gaining profits, self-fulfillment, spiritual and moral guidelines. The common culture and language are also significant: the mother tongue, through which the experience and knowledge of previous generations, culture and social reference points transmit; and the communicatory (non-native) language, which is spoken by and between billions of people.

Such social needs – sociocultural ties, shared values, religion, traditions, art, ethnic and interethnic contacts, etc. – are satisfied precisely in small groups with similar interests. Consequently, such self-governing communities of various types, manifesting themselves

in multiple respects (spiritual, religious, socio-economic, ethnic, organizational, managerial, communicative, political, educational, historical, ecological, etc.), can be created in clusters of linear cities.

At the same time, the development of science, culture and education, small and medium businesses, tourism and the service sector, intellectual and spiritual growth, upbringing of children, communicating with nature, growing organic food for oneself and members of one's family and other areas of academic, spiritual and physical activity will become the main work for many residents of linear cities.

Such work will be more exciting and significant for any society, including humanity in general. Thus, people will receive much higher wages than a coal miner, lathe operator, welder, steelworker or truck driver in a consumer society. Therefore, unemployment and poverty will become a thing of the past when the bulk of humanity moves from the concrete-asphalt jungles of megacities, torn from nature and life, to pedestrian linear cities, harmoniously blended with Live Nature.

An innovative strategy for transitioning local (cluster) societies of techno-consumers to a new state – an engineering socio-technogenic community – will prevail here. Such a readjustment of the long-term development vector of the Earth's human civilization assumes the conversion of military-industrial complexes and the creation of a new planetary eco-infrastructure – residential, transport, production (including agricultural), energy and information. As a result, it will become possible to use the social resources of the territories, the spiritual and intellectual potential of each person, energy- and resource-saving technologies, in particular, through the transition from the global export of resources and raw materials to the eco-production of goods and services (from the very same raw materials) in the clusters of linear cities – backed by our strength, interregional interaction and the human dimension in ecology.

4.4. Engineering Space Exploration

The reassessment of the engineering status and its inclusion into the context of the humankind moral life is intended to provide

conditions for the rationalization of civilization. In other words, such reassessment should create the initial necessary prerequisites for a rational arrangement of the human world. It also sets a new goal-setting horizon, in which civilization should no longer be considered as only an Earth's civilization but also as noospheric, take cosmic scales. The new approach directly follows the global significance of technology as a factor in civilizational development as well as from the global nature of the transformative possibilities of engineering. Moreover, when considering the prospects for transforming the people's lifestyle on Earth, inevitably conclude about the expediency of space exploration for industrial purposes.

The terrestrial technosphere occupies the same ecological niche as the biosphere: machines, mechanisms, technical devices are located in the thickness of the earth, water, air and actively exchange matter, energy and information with them. Environmental problems have already become acute in the last quarter of the 20th century because the technosphere in terms of its power supply, i.e., ability to transform the environment, has come close to the biosphere as a whole. For example, the biosphere reproduces 230 bln tons of dry organic matter per year, which, in terms of fuel, is only an order of magnitude greater than the annual energy consumption of all the equipment at the disposal of the Earth's civilization. And the volume of soil, ore and other types of raw materials transported and processed by machinery has come close to the volume of production of organic matter by the biosphere.

All technological resources are finite and nonrenewable due to the lack of circulation of substances, energy and information in the human-made technosphere. The main reason is that it does not have microscopic equivalent robots working at the atomic and molecular levels, such as microorganisms in the Earth's biosphere. If they were present, they could close local trophic industrial chains. The waste from engineering technologies, without any additional transportation and additional costs of energy and other resources, would become raw materials for other engineering technologies, and industrial (as well as biospheric) resources would become renewable.

Thus, the Earth's industry will continue to exist until it converts all the resources it needs into industrial waste thrown into the biosphere. And it does not matter whether the resources run out or the pollution destroys the biosphere because, in all these scenarios, any technogenic civilization will forego its future on its home planet. It will inevitably fade away and then die.

There is only one cardinal way out of this situation: it is necessary to provide the technosphere with an ecological niche outside the biosphere. This will ensure the preservation and development of the biosphere according to the laws and directions that have been formed over billions of years of evolution as well as the harmonious interaction of the people's community (as biological objects) with the biosphere.

There is no such ecological niche for the technosphere on Earth. But it exists in space, where for most technological processes there are ideal conditions: weightlessness, deep vacuum, ultrahigh and cryogenic temperatures, unlimited raw materials, energy and space resources, etc.

Thus, we reach the conclusion about the need of space industrialization, if in future the Earth's civilization continue the technological path of development. Humanity does not have much time for large-scale cosmic exploration – even with a reasonable reorganization of people's lifestyle on Earth. Technocratic oppression will be continued, although it has been optimized, which means further though slower but still degradation of the biosphere. Moving production into space not only solves this problem but also opens new vistas for engineering.

The entire terrestrial industry of the 21st century exists in the planetary technological environment, which is based on the specific gravity value (gravitational acceleration is 9.81 m/s^2 on average) and an air environment under the average pressure of 760 mm Hg, containing on average 21 % of very active oxidizing agent – oxygen. Gravity does not allow the creation of alloys and composites from materials with different densities – they are getting delaminated by the gravity forces. Many technological operations cannot be performed in the air, so they require vacuum systems. Moreover, obtaining 1 m^3 of deep

vacuum in terrestrial conditions is currently more expensive than extracting a ton of oil.

When the molten steel is poured out of the blast furnace, it burns and smokes. Thus, the process of metal oxidation with air oxygen takes place, as a result of which the metal loses its qualities [86, 87].

When obtaining medicines and other highly purified substances without impurities, ideal conditions are required, so the workshops for their production have a multi-circuit air purification system. However, this does not always help – even the most sterile air contains millions of tiny dust particles and thousands of microorganisms.

Earth's solar power generation industry does not work at night, in rain and cloudy weather, and the surface of solar panels should be constantly cleaned of dust and dirt.

We can continue to list the disadvantages of the planetary technological environment – there are thousands of them, including the limited material and spatial as well as energy and information resources.

The cosmic technological environment has many advantages. Weightlessness is the first one. If gravity is needed, it can be artificially created: any, arbitrarily large object (for example, planet Earth) can be spun around an imaginary axis without the use of thrust bearings since it is in space in zero gravity. The second advantage is deep vacuum and ultra-purity (including the absence of gases, air and microorganisms) extending to infinity. Thirdly, solar power plants (slender, light because they are weightless) in high orbits will work around the clock and year-round, they do not need to be cleaned of dust and dirt. Only one question remains – how to deliver all the necessary equipment into orbit and then how to transport space products back to Earth?

The geocosmic cargo flow determines the leading role of the industrial space exploration. In order to solve the problem of antagonism between the technosphere and the biosphere, which cannot be solved within Earth, it is necessary to establish production in space and the delivery of a sufficient amount of products to the planet. In the 21st century and in future, the annual individual consumption

of industrial products should be commensurate with the ergonomics of a person, and above all, with his or her body weight. So, for 10 bln people that is at least 100 mln tons per year of space products or at least 10 kg per resident of the planet. In this regard, geocosmic transport (GCT) has a key role to play.

To create and optimize GCT, which can ensure the industrial exploration of space and the transition from Earth's to space civilization, a fundamentally different approach is needed in comparison to ground transport.

The fact is we are on a planet in a very deep gravitational pit, to get out of which we can either by rising into the infinity or flying out with the first cosmic velocity, equal to 7,919 m/s of the zero altitudes. And not vertically up but passing over to a low circular orbit, i.e., parallel to the surface of Earth. Therefore, each ton of cargo delivered to orbit must be supplied with a minimum of 8,700 kW·h of energy, which, for example, corresponds to the kinetic energy of a train about 20 km in length and more than 80,000 tons in weight, rushing at a speed of 100 km/h (the rocket system spends tens of times more energy on this work due to the low overall efficiency factor of the system). The traditional ground transport does not need so much energy – it moves from point A to point B horizontally along the bottom of the “pit”, i.e., over the surface of the planet.

Extremely high energy expenditures during the space industrialization impose a few serious restrictions on GCT:

- its efficiency factor should be close to 100 %, since even a relatively small release of energy into the environment, i.e., into the atmosphere through which cargo should be transported to orbit, will lead to catastrophic environmental problems during the operation of GCT;
- it is necessary to use the most environmentally friendly energy – electric – as the reference energy for GCT.

In addition to solving environmental problems, an increase in the efficiency of GCT will reduce the net cost of delivering cargo to orbit, which is inversely proportional to the efficiency factor of the transportation system (similar to any ground mode of transport).

Currently widely used rockets as a transport for all these requirements do not fit categorically.

In fact, launch vehicles are extremely inefficient and causes the largest damage to the environment. If we consider all the flight and preflight costs and energy losses, then the efficiency factor of the rocket is less than 1 %, which is an order of magnitude worse than that of an archaic steam locomotive. In addition, it has long been calculated that only 80 launches per year of heavy Space Shuttle rockets can destroy the planet's ozone layer. The maximum permissible productivity of the entire world rocket and space complex by the end of the first quarter of the 21st century is less than 1,000 tons of cargo per year (only 0.1 g/year per one inhabitant of the planet), which, from the transport point of view, is at the productivity level of one earthly cart with a pair of strong horses. With the fabulously high transportation cost, the delivery of each ton of cargo into orbit costs about 10 mln USD.

There are various alternatives to rockets. A space elevator, a space tram, an electromagnetic accelerator, etc. If we consider this list from the proposed GCT requirements point of view, then to the greatest extent, only one engineering solution presented back in the 20th century corresponds to them – the General Planetary Vehicle (GPV), developed by the engineer Anatoli Unitsky [1, 77, 81, 88, 89].

The GPV is a ring located along the Earth's equator (or parallel to the equator), consisting of separate segments united by two longitudinal channels isolated from the external environment, in which vacuum is maintained. Inside the channels there are two linear (ribbon) rotor-flywheels, covering the planet and held by a system of electromagnets mounted on the principle of magnetic levitation, which are the rotors of a giant electric motor capable of operating in generator mode.

The ring is located on a specially equipped overpass encircling the planet and running on land as well as on water (on special underwater pontoons). With the help of an external energy source, one of the linear rotors located inside the ring accelerates along the channel and, accordingly, spins around the planet to a speed exceeding the first cosmic velocity. Thanks to centrifugal force, each linear meter

of the rotor first (when reaching the first cosmic velocity) balances its weight and then tends to rise up, providing lift force.

In the initial state, the ring is fixed to the overpass along its entire length. After the clamps are released, each linear meter of the GPV begins to rise upward relative to the center of the planet, i.e., increase its radius and, accordingly, its length. The design of linear ring objects (vacuum channel housings, linear electric motors, belt rotors) allows to increase their length by 1.57 % for every 100 km of ascent above the Earth's surface. After leaving the dense layers of the atmosphere, the rotor is transferred to the generator mode, and the generated electricity is used to accelerate the second rotor in the opposite direction. As a result, the body with the payload placed in it (or on it) begins not only to rise (lengthen) up into space, getting out of the Earth's gravitational pit, but also to rotate around the planet until it reaches the first cosmic velocity at a given height. The height that the GPV ring reaches and stabilizes at is determined by the excess of the initial kinetic energy of the rotor and the possibilities of elongation (stretching) of the ring.

The unloading of the GPV is carried out in special modules of the stationary orbital infrastructure located in the equatorial plane at an altitude of several hundred kilometers. In this orbit, it is proposed to place the entire heavy industry of Earth: plants, factories, workshops, power plants, chemical enterprises as well as the orbital settlements of earthlings serving this industry – scientists, engineers, technologists, machine builders, space builders.

The GPV landing on Earth is carried out in the same logic as the takeoff but in reverse order.

For one flight only (!) the GPV can deliver into orbit about 10 mln tons of all kinds of cargo³ and 10 mln passengers⁴. In a year, this giant self-supporting aircraft, using only its internal forces, will be able to go into space up to 100 times.

³ Modern astronautics will require at least 20,000 years for the same volume of transportation.

⁴ It would take more than 100,000 years to get the same number of people into orbit using modern launch vehicles.



The implementation of such an engineering solution as the GPV will reduce the cost of geocosmic transportation by more than 1,000 times – up to 1,000 USD (and even lower) per ton of cargo.

An environmentally friendly self-supporting GCT, operating exclusively on electric energy, will make it possible to carry out the industrialization of near space and ensure the removal of all industrial production harmful to the Earth's biosphere from the planet, creating them again in the near-Earth orbit. This will immediately open access to fundamentally new technologies with unique space capabilities that are not available on Earth. Tremendous prospects are also being opened in the field of information and energy communications. The removal of industry from the planet will radically improve the common habitat of people and living beings, the Earth's biosphere, especially in industrial regions, without any restrictions on the production growth.

Almost all engineering solutions used in the project are widely known, tested in practice and currently implemented in industry. The project has been repeatedly studied and verified by calculation methods. It is technically and economically justified. To implement it, there are enough opportunities and means even for one country, for example, such as the USA, China or Russia. In the 21st century humanity has everything it needs to carry out the project:

1) finances: you need about 3 tln USD (within 20 years – about 150 bln USD annually), i.e., 4-5 annual US military budgets;

2) metal (mainly steel): about 100 mln tons are required (for 20 years – about 150 mln tons of metal annually), i.e., as much steel as it is smelted in the world in a couple of weeks or as much as it is spent for a few months only to produce cars;

3) concrete: about 10 mln m³ is enough (for 20 years – about 500,000 m³ of concrete annually), i.e., approximately the same amount was spent on the construction of the Sayano-Shushenskaya Hydroelectric Power Plant;

4) electrical energy: the power consumption of the GPV (for the specified volume of geocosmic transportation) will be about 100 mln kW, which is commensurate with the power of a heavy

Space Shuttle launch vehicle, or less than 5 % of the total power of the world's power plants⁵.

The project implementation period is 20–25 years, considering sociopolitical, research, development, design and survey, construction and installation work.

Such a global geocosmic program will unite all developed countries of the world with common goals and objectives as well as attract them to the financing of this superambitious project designed to save humanity.

In the first years of the GPV operation about 100 mln tons of equipment, structures and materials will be delivered to the near space from Earth, sufficient to create the following elements within the equatorial orbits at an altitude of 300–500 km [77]:

1) solar power industry with a peak capacity of approximately 2 bln kW (this is the capacity of all power plants in the world today), since about 1 kW of power can be obtained from 1 m² of the surface illuminated in space. Fuel for these and subsequently built power plants – hydrogen in our Sun – will be enough for at least 5 bln years;

2) several hundred space settlements for long-term residence and work on the orbit for several hundred thousand people;

3) the basic linear platform of the Industrial Space Necklace "Orbit" (ISN "Orbit") with the relevant infrastructure communication (transport, energy and information) along it, made using string technologies, with a length of more than 42,000 km.

Around space string communications and infrastructure modules, as around catalysts, the "crystals" of the orbital industrial ring will grow up over time – laboratories, shops, factories, power plants and other industrial facilities. The personnel servicing the space industry will be able to live and work in the residential biosphere

⁵ The GPV creates a stable load, unchanged during peak and low-load hours, which is the best option for generation. It increases the efficiency of the global energy system as a whole. In order to increase the efficiency of GPV sections connected to existing generating sources, it is possible to reduce slightly the consumption during peak hours and maximize it during low-load hours. This will increase the lifting time of the GPV but will improve the efficiency of the process.

settlements built nearby with more comfortable conditions than on the planet. Eventually, the population will reach about 10 mln people (0.1 % of the Earth's population).

Thus, during the 21st century the main part of the harmful terrestrial industry can be taken out of the planet by engineering means, precisely, can be newly created in the near space on circular equatorial orbits in the conditions of the space technological environment. To implement this plan, 5 tln USD of investments annually is quite enough – an insignificant part of what is planned to be invested in the program for "rescuing" the world economy, which is actually a program for genocide of civilization.

This will allow within about 50 years to complete reloading of our technogenic civilization to the cosmic vector of development according to a new resource logic under the motto: "Earth – for Life. Space – for Industry".

With a full-scale engineering approach based on reason and with the implementation of specific practical solutions presented in the previous chapters, the world of the 21st century, poisoned and suffocating in a crush of people and machines, can be changed in a short time.

An anthropogenic biota will be created on 1/15 of land (1/60 of the planet's surface). It will be able to feed and service all 10 bln people by that time. And the natural biota will be preserved on the rest of the land (14/15 of land, or 59/60 of the entire surface of the planet). This will ensure the natural biological regulation of the environment existed in the preindustrial era. The main part of the technosphere will be in the outer space, while the remaining industries on Earth will include terrestrial agriculture and medicine, green transport and eco-infrastructure, ecologically friendly constructions and pedestrian linear cities as well as individual environmentally friendly structural elements of the general planetary power industry, communications and mechanical engineering.

Taking the industry into space will open access to inexhaustible mineral resources in the Solar System, in particular to heavy metals, the reserves of which are limited on Earth. For example, the asteroid Psyche, located in the asteroid ring of the Solar System between

Mars and Jupiter, having a diameter of about 250 km and a mass of almost 10^{18} tons (million trillion tons), according to experts, consists of 90 % iron and nickel [90]. And the gold reserves are estimated there as hundreds of billions of tons.

The Industrial Space Necklace of the planet will become a springboard for protection against cosmic threats (including meteorites) and a platform for the Earth's civilization expansion into deep space, where you can create various biosphere banks of samples of living fertile soils, microflora and microfauna, flora and fauna, delivered from Earth. Consequently, no human-made or natural cataclysms and catastrophes on the planet that can kill the Earth's biosphere won't be able to destroy thousands of enclosed and autonomous ecosystems located in orbit in space ecohouses.

The Earth's, no longer technogenic but engineering civilization, taught by the bitter experience of difficult relationships with the surrounding nature on its native planet, in its home – in the living biosphere, will take careful steps in space in order to fit into the surrounding space environment harmoniously – into someone else's (cosmic) house, although dead in the Earth's vicinity. This will enable our engineering civilization not only to survive but also steadily and indefinitely develop in the space and time of the infinite Universe.

5. ENGINEERING ESCHATOLOGY

5.1. Inevitability of Engineering

Everyone could feel the rain coming. Gust after gust. Approaching dusk and the rising tide. The Sun rises indomitably afterward.

Technocratic civilization has exhausted itself. It is in a crisis. It has only two ways – degradation or development. The possible vector of both is predetermined. It is a technogenic process that has degenerated into technocracy and is doomed either to perish or to transform into a new engineering mode.

The critical situation reached in the first quarter of the 21st century is conditioned in two ways. On the one hand, as a deadlock, – the fundamental contradiction between techno- and biosphere. On the other hand, colossal engineering capabilities to resolve this contradiction.

Humankind has long contemplated on a reasonable readjustment. The hero of Victor Hugo's novel "Ninety-Three", thrown into the dungeon of an ancient tower, condemned to death at dawn, argues:

"You demand compulsory military service. Against whom? Against mankind. I object to military service; I would have peace. You desire to help the wretched; what I wish is the abolition of their misery. You demand proportionate taxation; I would have no taxes whatsoever. I would have the public expenses reduced to the lowest level, and paid for by the social surplus."

"What do you mean by that?"

"This: In the first place, it is for you to suppress sycophancy, – that of the priest, the soldier, and the judge. Then, use your wealth to the best advantage; distribute over your furrows all that fertilizing

matter which is now thrown into your sewers. Three quarters of the soil lies fallow; plough it up; redeem the waste pastures; divide the communal lands; let each man have a farm, and each farm a man. You will increase a hundredfold the social product. At the present time, France affords her peasants meat but four times a year; well cultivated, she could feed three millions of men, all Europe. Utilize nature, that gigantic auxiliary; enlist every breeze, every waterfall, every magnetic current, in your service. This globe has a subterranean network of veins, through which flows a marvellous circulation of water, oil, and fire; pierce this vein of the globe, and let the water feed your fountains, the oil your lamps, and the fire your hearths. Consider the action of the waves, – the ebb and flow of the tides. What is the ocean? A prodigious force wasted. How stupid is the earth, to make no use of the ocean!" [91].

Previously, people were also thinking about the potential of the sphere of mind realized in technology, i.e., the noosphere. Konstantin Tsiolkovsky, the founder of rocket cosmonautics, created his cosmic philosophy. It is based on the principles of the unity of human and the Universe as well as the projective attitude of human to the world, assuming radical transformations of Earth, the cosmos and humans themselves with the help of mind. "Reason is the greatest force in the cosmos," the scientist kept repeating [92]. The cosmos is a unity of mind and matter, which is in the process of self-organization and evolution. Not only humankind is the bearer of reason. There are many intelligent beings inhabiting the Universe, and the Universe itself is endowed with reason. It arises in the process of self-organization, passing through a number of stages from the physical vacuum, through the emergence of quarks, gluon plasma, atoms, protoaggregation of galaxies, then the emergence of galaxies themselves, stars, planets, biosphere, anthroposphere, sociosphere and, in fact, the sphere of reason, called noosphere in the works of Vernadsky.

According to Tsiolkovsky's assertion, the latter is the peak of self-organization and the determining factor of further development of the Universe. The main actors in this process on the scale of Earth are geniuses: "Geniuses have performed and are performing miracles.

Who does not know it!" [93]. Geniuses "are needed not only for the circulation and assimilation of truths already discovered long ago, although not used by people, but also for the generation of new ones. Moral and every kind of light emanates from geniuses" [93]. "The thoughts of geniuses are immortal as well as their deeds, because even after death they continue and give infinite and limitless fruit" [93].

Vladimir Vernadsky agrees with Konstantin Tsiolkovsky that human and humanity cannot be understood if we consider them in isolation from more global processes and phenomena. First of all, according to Vernadsky, human is connected with the "living natural body" and "living matter" of the environment – the biosphere. At that, the scientist understood "living matter" as the whole "totality of the living organisms inhabiting it" [94]. Living matter is in constant intensive interaction with the nonliving part of the biosphere and outer space. "The matter exchange is implemented through the atomic movement caused by the living matter... The planetary, cosmic significance of the living matter manifests itself just in this biogenic flow of atoms and in the energy involved in it. For the biosphere is the only envelope of the Earth into which the cosmic energy and cosmic radiation permanently penetrate. Cosmic radiation, first of all the solar one, supports the dynamic equilibrium and the organization between the biosphere and the living matter" [94].

The activity of reason transforming the biosphere turns out to be a part of not only local, terrestrial processes but also the life of the Universe as a whole. "By his scientific thought and state-organized technology generated by this thought, by his very life, man creates a new biogenic force in the biosphere: the force directing his reproduction and creating favorable conditions for the settlement of man in such parts of the biosphere whereto his life (in some places, even any life at all) previously did not penetrate. Theoretically, we do not see any limit for his potentialities..." writes Vernadsky [94]. Humankind on the scale of the planet fulfills a controlling role, and its entry into space is a natural and inevitable stage in the evolution of the biosphere and the Universe as a whole. However, it can happen under

certain conditions, associated by the scientist with the formation of the noosphere.

Consequently, two moments are the prerequisites for the replacement of the anthroposphere by the noosphere: the domination of human over external nature and the domination of the forces of mind over the lowest instincts in humans themselves. "...The course of the history of the scientific thought becomes for us a natural process of the history of biosphere. The historical process as the manifestation of the world history of the mankind is revealed before us in its one but cardinal consequence, as the natural phenomenon having essential geological significance" [94].

In order for the noosphere to emerge, it is necessary to unite humankind. Vernadsky believed that already in his time, by the middle of the 20th century, there were all prerequisites for that: "The first time in the history of the mankind that we live under the conditions of the united historical process that embraced all the biosphere of the planet" [94]. At the same time, Vernadsky was one of the first who felt the importance of transition to a new quality and realized that otherwise humankind would perish: "It is for the first time that a man had recognized himself as an inhabitant of the planet and may (and must) think and act from another viewpoint – not solely from that of a separate personality, family, or kin, state, union of states, but also from the planetary point of view" [95].

In the 21st century, when global environmental, political and other problems are reaching the peak of their significance, these ideas are acquiring a second birth, however, Vernadsky does not say much about how exactly the transition to the noosphere is possible. According to the generalizations of Fidana Yanshina, a researcher of his work, the Russian scientist formulated the following 12 conditions for the formation of the noosphere in the future [96]:

- human settlement of the entire planet;
- a dramatic transformation of the means of communication and exchange between different countries;
- strengthening of ties, including political ones, among the nations of Earth;

- predominance of the geological role of human over other geological processes occurring in the biosphere;
- expansion of the biosphere's boundaries and entry into space;
- discovery of new energy sources;
- equality of people of all races and religions;
- increase in the role of people's masses in solving issues of foreign and domestic policy;
- freedom of scientific thought and scientific search from the pressure of religious, philosophical and political constructions as well as the creation of conditions favorable to free scientific thought in the social and state system;
- improvement of the workers' well-being. Formation of a real possibility to prevent malnutrition, hunger, poverty;
 - alleviation of the impact of diseases;
 - intelligent transformation of the Earth's primary nature to make it capable of meeting all the material, aesthetic and spiritual needs of the numerically increasing population;
 - elimination of wars from the life of humankind.

As Vernadsky believed, many of the conditions necessary for the transition to the noosphere had been fulfilled. The unity of civilization, living matter, biosphere and space has been achieved through engineering and technology. So far, this unity is negative. It has a destructive nature. It is the unity of war. A unity of entities clashing to the death in the darkness of the Universe. But the light of mind lurks in that darkness. Either it triumphs and a star blazes or darkness will engulf everything.

The positions of mind are still strong. In 1793, when the revolutionary calendar was introduced in France and a new era was ushered in, the meaning and possibilities of engineering were just being discovered. Humanity did not have a hundredth of the technological power, which it has in the 21st century. Nevertheless, people dreamed. People are still dreaming today. They have everything in their hands to realize their dreams. How to do it? We have been discussing this throughout our research. Now it is time to summarize the results.

1. Engineers have created our civilized world.
2. Engineering inventions, which have become technology in the global sense, have engaged in a battle with nature. As a result, civilization turns out to be a mighty locust, devouring everything in its path like mold, taking over and destroying every last square millimeter of its own home.
3. The evil brought by engineering comes from the fact that the engineering itself remains beyond good and evil. Engineering cannot be morally neutral without posing a mortal threat to its creator.
4. Engineering should absorb the space of morality in the same way that medicine and jurisprudence received ethical regularity in the Middle Ages.
5. Engineering, as a toolkit for solving problems while meeting the requirements of maximum efficiency in conditions of limited means and while accepting life as the supreme goal should become the goal-setting structure of civilization to ensure its survival.
6. Engineering can and should become a supreme value, provided that at the same time life is recognized as a supreme goal.
7. Technocratic civilization, completely exhausted, will be reduced to a primitive state or transformed into an engineering civilization.
8. Transformation mechanisms can be launched through the implementation of large-scale projects aimed at a global civilizational transformation. The logic of small engineering steps is a priori untenable because it cannot compete with market megaprojects launched by states and corporations in order to obtain immediate benefits for a narrow circle of power "elites".
9. The world capitalist elites are not interested in the implementation of global projects significant for noospheric development. For them, it will mean the loss of control over the situation and destabilization of the system in which they have surrounded themselves with a zone of maximum comfort.
10. Realization of large engineering projects aimed at global technological transformations and preservation of decent conditions of life development for people can be carried out by the efforts

of people themselves. Technological solutions of the 21st century allow to launch megaprojects privately. This does not necessarily require the participation of the state, but every state is interested to get involved in such projects in order to preserve itself in a modified, improved shape.

11. Engineering cannot and should not manage society. It is a mediator between nature and human, and therefore, as a supreme value, it is called to become the harmonizing apex of the noosphere triangle. Engineering is called upon to serve humanity. It should be the god that responds to our requests. Engineers will become its priests.

12. Acknowledged, accepted as a supreme value and goal-setting structure, engineering embodied in technology is the primary intelligent means of preserving and enhancing humanity. By conquering the boundaries of the physical world, engineering reveals the boundlessness of the world and the possibilities that the infinite Universe holds.

Once the boundary of the world for human was drawn by a line on the horizon. Engineering genius created the ship. Columbus sailed to discover America with little more than a compass for navigation. His ships didn't even have a helm, which was not yet common at the time. They steered with a lever. They suffered and died from scurvy, not knowing that it could be avoided by simply taking some sauerkraut and lemons on board. Magellan had sailed for months in the Pacific Ocean, seeing around him nothing but sea and sky. He expected that he was about to reach the shore. This was evidenced by all the maps, which turned out to be made on the basis of calculations, where the length of the equator was shorter by several thousand kilometers. Nevertheless, they were achieving their goals and, armed with engineering, were moving civilization forward. The people of the 21st century have much more at their disposal than the pioneers. Their discoveries can and should be much more far-reaching.

5.2. The World as an Engineering Project

For thousands of years, humans have been living on the surface of Earth, constantly making and improving their discoveries,

only guessing what is happening above and below them. Not only the center of our planet, which has a temperature of about 6,000 °C and a pressure of 3.7 mln atmospheres, has not been examined, but even the World Ocean is explored by less than 5 % to date. This is because 98 % of the ocean floor lies at a depth of more than 6 km. We study the structure of Earth theoretically with the help of the physics of oscillatory-wave processes by the propagation of disturbances during earthquakes.

Oceanologists conduct deep-sea research using various instruments (hygrostat, bathyscaphe, bathysphere, etc.), but only at relatively shallow depths. Again, deeper layers can only be guessed at or judged by indirect indications. Nobody has ever been able to see with their own eyes what is happening right next to us by cosmic standards. Researchers are only contemplating plans to drill through the Earth's crust and penetrate to the mantle through it to gather information about Earth or to dive beneath the thickness of the vast oceans.

Perhaps, it is a good thing that humankind is being in its unenlightened spiritual and moral state so far, oriented towards exploitation of the planet and profit, has no opportunity to penetrate these deep spheres as much as we have little opportunity to penetrate space. Offshore oil extraction threatens the ocean ecosystem. In the 20th century, the world's waters have been shaken by dozens of major disasters such as oil rig explosions, tanker wrecks, ship collisions and oil spills (tens of millions of barrels) during regional conflicts. In 1991, during the Gulf War, an oil spill killed more than 30,000 birds. Oil wells had been burning for months, and black rains had been falling over an entire region, including Turkey, the UAE and Kuwait; hundreds of oil lakes took decades to dry up.

In 2010, the oil spill disaster in the Gulf of Mexico had killed tens of thousands of birds, marine mammals and fish, caused massive plant mortality and soil erosion. The consequences of these monstrous abuses of the planet require many years of thorough work to clean up the waters and restore conditions close to those that had existed before. And this is despite the fact that the consequences of accidents are impossible to eradicate completely in the next dozens of years,

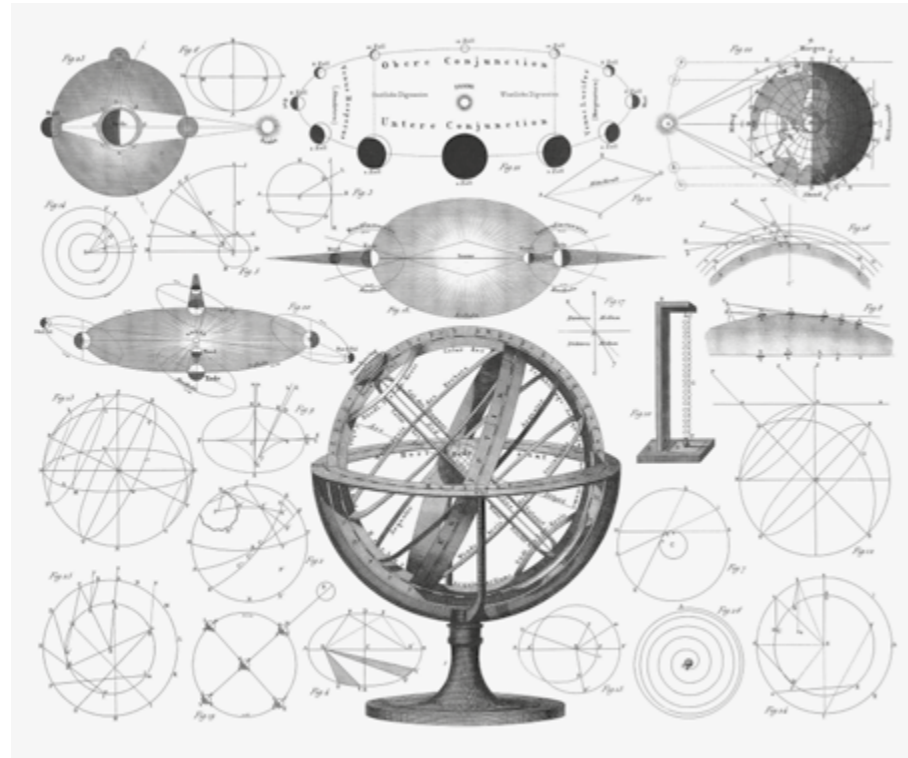
even on the condition that no more of such disasters will occur during the entire recovery period.

As for the causes of catastrophes, they are all the same: failure to study Earth before drilling; rushing to develop an oil field as soon as possible; improper operation of equipment and failure to apply the necessary safety measures; trying to harm the enemy during a conflict; etc. All of the above is the result of the fact that engineering remains just a tool in the hands of capital and is forced to dance to its army drums leading to slaughter.

Humankind is not frightened by its own mistakes, although it sees and feels the terrible consequences of its deeds. The official cause of the disaster in the Gulf of Mexico was a management error in the development of the oil field. No matter how many accidents there have been, the paradigm of management in its desire to make money at any cost is not changing. And behind those few guilty people who will be probably punished for the ruthless destruction of life on Earth, there are already thousands of the same cynical "managers" who are ready to test the world for strength, satisfying their greediness.

We know, although we have not seen the core of Earth itself, that it creates a magnetic field, without which the solar wind will reach the surface of the planet and destroy all living things. We know that biogenic substances of the deep layers of the ocean, i.e., phosphates, nitrates, are fertilizers, which, when carried by the current to the upper layers, create the necessary conditions for life. And the productivity of phytoplankton itself is comparable to that of land plants. We are aware that the ozone shield protects us from solar radiation and that life under direct ultraviolet radiation would be impossible for us. Both gravity and the atmosphere, in which celestial bodies burn up, protect us by counteracting powerful external forces that could destroy all life on our home planet.

The conditions for the emergence and existence of life seem to be thoroughly designed by someone in the Universe and on Earth. For example, the gas balance of the atmosphere, among other parameters, has a constant ratio of oxygen (21 %) and a small amount (less than 1 %) of the main greenhouse gases – water vapors and carbon dioxide.



If the balance is shifted towards an increase in these gases, the greenhouse effect will increase, climate change will follow, ocean level will rise, and global warming will accelerate. If the balance shifts towards an increase in oxygen content, oxidative processes on the planet will become much more intense, forest fires will become even more frequent, which will significantly change the circulation of all organic and inorganic substances.

The world is arranged in an amazingly expedient way, and the interrelationships between substances and processes are innumerable. In fact, the deeper scientific knowledge advances, the easier it becomes to believe in God – so magnificent is the Universe. Forces and energies are balanced and aligned with each other with exact precision. Some might argue that the current state of the world is the result of the long-term formation of the planet, which has been subjected to serious tests and cataclysms for billions of years. It is so, but this makes the originated life even more marvelous and valuable because such conditions for its appearance on the planet could not have arisen at all. Moreover, the space explored by people is not suitable without special technological equipment for the existence of human, albeit technogenic, civilization. And certainly, the celestial bodies known to us are not suitable for the emergence of life as such.

A human as a living being commensurate to the reader and as a single organism consisting of trillions of cells, thousands of organs and biomechanisms (only when we smile, up to 53 facial muscles work) is arranged much more complex than the entire observable Universe, all its inanimate part with billions of trillions of stars. Even a tiny component of living cells – each DNA molecule containing the most complex spatially structured billions of atoms of dozens of chemical elements – is, from the engineering point of view, an incredibly more complex structure than, for example, the entire aggregate inanimate Earth's industry created by billions of people over millennia.

If DNA is compared, for example, to an airplane, it is about a million times more complex than it. However, without bioengineering communications (nervous, cardiovascular, respiratory, digestive, excretory, reproductive, endocrine, immune and integumentary

systems with millions of complex “sensors” – receptors) with information channels from sense organs (vision, hearing, sense of smell, touch, etc.) would DNA macromolecules be assembled into a cell, cells – into organs, and organs – into a human organism? Even if they had assembled, would such an organism be able to exist as a random set of “parts” and “bricks”, as something whole and stable without the abovementioned transport and communication bioengineering systems, including 100,000 km of vessels and 200,000 km of nerve fibers in the human body?

Those who believe that life could have originated by chance and perhaps exists or has existed in some forms elsewhere must still be aware of how rare and negligible such a probability must be. This probability is unimaginably low. For the accident advent of life, it would take a trillion times longer period than the age of our Universe.

So, who (or what?), why (randomly or by intelligent design?), how (haphazardly or as planned?) and why (for the sake of dead matter or for the sake of intelligent life?) created our world and tuned it so finely? If the fundamental constants and initial conditions included in the laws of physics (mass of proton, neutron and electron, Planck’s constant and gravitational force, weak interaction and cosmological constant, change of energy density and three-dimensionality of space, etc.) differed from the existing values by at least one thousandth, there would be neither atoms, nor molecules, nor stars, nor planets, nor highly organized matter, nor intelligent life in our Universe.

Scientific skepticism claims that if eternity is multiplied by dozens of billions of trillions of stars in the Universe, we will get life somewhere. But what is randomness, can be considered both necessity and regularity. Indeed, both the internal expediency of Live Nature, which Aristotle called “reason acting on its own” [97], and the presence of consciousness in human, with its distinction between moral forms and what Kant defined as the “categorical imperative” [98], lead us to the idea of a rational prime cause. Anyway, the world is organized expediently and reasonably – as far as it is possible for human to comprehend expediency to the extent of reasonableness.



Earth's human civilization, getting at its disposal more efficient ways of resource extraction and energy management, is engaged in undermining natural world systems. The safety margin of planet Earth is truly great, but it is not infinite.

For thousands of years people have poorly studied the world in which they live, they still have little understanding of the laws operating in it, but they persistently destroy everything around them and do not pay attention to the consequences. And if the world had been designed by one of those "successful managers" who care about the safety margin of a product only as much as the product can be sold more efficiently and for the greatest number of times, people would not have existed long ago.

In part, this feeling of isolation from higher-order meanings and the idea of an earthly life, in which it is necessary to grab as much as possible, form the consciousness of a successful ambitious person of the 21st century. Fortunately, the safety margin of the created world gives us time to come to our senses and deal with this profoundly wrong approach. The process has already started, and this problem will not be solved by itself because those who are rocking the boat will persist in their crazy business with the persistence of morons until we all, together with the boat, sink.

5.3. God as an Engineer

We do not know the temporal beginnings and spatial boundaries of the world. Nor do we know what awaits us at the end of time, nor do we know if human history will ever be completed. The fate of life as such on our planet depends on us only partially and may one day continue without our participation. Thus, we influence only the possibility of our own survival at this point in the development of the world. Then what is our freedom of choice if not to be reasonable beings in a reasonable nature? And for nature, reasonableness consists in preserving life by any means and under any conditions. Nature knows no agonizing contradictions or bifurcation. It is endowed with a relentless will to overcome and acts, including in every living organism, according to its own laws by itself, like an element.



We can say that life is always busy reproducing itself – such is its nature and its meaning.

Only people realize the world of separate and alienated objects, feel their mortality in it and in one way or another reflect on what happens to them. From this, there arise, even if not always conscious, attempts to define one's own meaning and relate to the world and other people. To replenish the content of life through activity and the creative act or to dissolve into principled thoughtlessness and pleasure, to rise in the material world or to diminish in the spiritual world, to mature in godlessness or to grieve in God's abandonment. Thinking in this sense is the opposite of vitality as a natural force because if we subtract thinking (reason) from a human being, we are left with only a living being, i.e., an animal. That is why, in this conflict, the mass culture of the 21st century works to reduce consciousness to vitality and to reduce thinking to stupidity. Then "animal rationality" will allow us to take and do what we want by the right of the strong, to seek only our own satisfaction and to destroy each other openly. Many people live this way... Many will live this way no matter what. But if the majority become like the many, all will perish.

Our survival should take place only on the condition that we do not lose our human image, and we may not worry about life in a state of savagery – it will make its own way, as it has occurred before, during billions of years of evolution on our planet. It is important to be preserved precisely with those high achievements in the fields of knowledge that we have acquired over all these centuries, it is important to preserve the ability to think and act reasonably.

Human rationality is thought of as a state in which thinking overcomes dissociation from the world and something individual as the overriding principle. This reasonableness includes the whole historical experience, spirituality and creativity. What is reasonable cannot be immoral, and in this sense no category in itself, in isolation from the universal, can claim to be absolute. Rationality as such is irrational if it is immoral and does not serve the purpose of preserving life and affirming its status as the highest value. The rationality of concentration camps that exterminate doomed prisoners efficiently

and systematically, using their blood for transfusions to their wounded soldiers, hair – for overcoats, ashes – for fertilizer, is senseless. Rational but senseless are Malthus's ideas of population regulation; also, one-sided and unreasonable are the explanations of the historical development of society solely on the basis of production relations in Marx's economic theory. Senseless and irrational, but trying to appear so, are Schwab's ideas of inclusive capitalism, universal digital control and the abolition of nation states.

The truly global challenge is to completely change the paradigm and establish new value orientations. Civilization can integrate into the reasonable Live Nature and not destroy it as a resource, but let it develop for the benefit of humankind. In time, it will help people to obliterate the consequences of their own unreasonable actions. We can get involved in this process only with the help of engineering. This will be the reasonableness of human beings, which is synergistically interconnected with the natural reasonableness through technical achievements. In such a case, humans will be enabled due to their consciousness to rise above the unenlightened element of the wilderness where life engulfs life. If engineering as a tool and method is placed at the service of reason, and reason is guided solely by moral goal-setting and moral orientations, then engineering also becomes a reasonable and, consequently, moral force at human's disposal.

Thinking as such makes us humans, but in order to be intelligent, human needs spiritual and moral goals that will not allow our thinking to work to self-destruction or to use each other. Thinking, if only it is able to be preserved in the Universe as a phenomenon, should not be in contradiction with natural vitality. Thinking must be directed towards the creation and defense of life, engineering creativity and solving the problems of humanity that will be posed to it. Such benevolent thinking denies the dark irrational side of the human soul and the phantasms it produces. For rational thinking there is an objective truth, universal salvation and the transformation of the world. There is the prospect of development and the hope for a better future in harmony with nature. In a world guided by such principles, personal benefit will never supersede the common good or the life of another,

and achievements will be morally justified and put at the service of human.

In the 21st century, people put their hope on thinking that will overcome the conflict with vitality, having in mind spiritual guidelines. People can only trust in rationality, which will be guided by moral rules, and ultimately in engineering, which should save from extinction or a return to primitive barbarism. Because the world was created by engineers. Only engineers can maintain and preserve this world.

P. S.

So why should we save the world and what is the sense of humanity's life? It is our task to save the world not only because it is expedient, beautiful and built according to the anthropic principle, but also because the knowledge of ourselves, the essence of existence and the definition of the meaning of life is the conceivable limit that is set before human as a being not so much material as spiritual.

It is necessary to save the world so that we and our descendants at least have an opportunity to ask ourselves these questions and answer them on the basis of our perceptions and knowledge about the World. The individual sense of each person's life will never be learned if we all do not have a chance to survive and be saved from madness. Salvation in turn cannot be exclusively individual. On the contrary, it presupposes universal salvation and restoration of the world.

If we talk about the sense of life of all humankind, it is inconceivable without spiritual growth. The result of rational human activity should be the transformation of the biosphere into the noosphere, which, according to Vernadsky, occurs under the action of a special energy: "This new form of biogeochemical energy, which can be called the energy of human culture or cultural biogeochemical energy, is the form of biogeochemical energy that creates the noosphere at present" [94]. The culture we create is meant to transform the world. This is the sense of humanity. We fit out the world like gardeners shape their gardens. Cultivation of the garden, active work in it or contemplation of its beauty is a form of cognition of existence and ourselves, leading us to new horizons of senses. And if we are truly intelligent, we are chosen to be responsible for all life on our planet.

PRAYERS OF THE WORLD ENGINEER

An engineer is a part of society, he is also a part of the Universe, incomparably larger than himself, than the whole of Humanity and Life itself. Life is but a tiny living part of the material Universe, perhaps a trillionth or even less, even if all the planets of the Universe were inhabited by living beings. Therefore, the acceptance of engineering as the highest value of civilization must involve some kind of self-definition of the engineer and engineering itself on the scale of the Absolute. Somehow the engineer, as creator, should relate to the Creator of all things, whatever we mean by that – the objective laws of the Universe or the subjective will of the Deity who have created and controls all things. Traditionally, one form of correlation between human and the Absolute is prayer.

The word “prayer” in the English version comes from a Proto-Indo-European root meaning “to pray”. In the Russian version, despite the difference in sound, the essence is the same. The concept goes back to Old Slavonic *molíti*, from Proto-Slavonic *moliti* and means “to ask for something” (from God, Gods, Goddesses). There is also a consonance with *malyy* (“small” in English), *umalyat’* (“to diminish” in English), i.e., to evaluate something as less in relation to something more significant and important. Thus, in prayer, at different times, in various languages, countries and on different continents, people in many ways recognize their smallness in relation to the powers that rule the World and ask these powers to condescend to them, to grant their requests.

As defined by the Concise Dictionary of Religion and Philosophy, prayer is “an important part of the spiritual life of a believer, his relationship with God, either individually or in a community of other believers, often an outpouring of the soul, presented to God



with an open heart, in reverence, trust, hope and love... Prayer is not a retreat from the world, not a floating in higher spheres but a desire to enter better into the affairs and problems of life under the sign of His will and His plan. Prayer is a means of reconciliation with God, a source of knowledge of God, knowledge of God's ways in the world and the attainment of inner peace" [99]. From this we can conclude that prayer is also an inner motivation for creativity, since human never saw himself as an exclusively passive participant of the events, but even in the logic of heroic fatalism, the ancient Greeks saw themselves as free men, despite the pressure of fate and the predetermination of destiny. At least in the way of accepting fate – with despondency or gratitude, with cowardice or with dignity and courage. All this is very important in engineering, as long as it really changes the world around us. It is important that human's design does not contradict the design of God or Nature, whether the engineer is an atheist or a believer. No one creates in a spiritual vacuum. Moreover, creativity is always a quest for unity with the Absolute, no matter how it is interpreted.

However, if an engineer is an atheist, does he need prayer? My answer is yes. It is not only necessary but essential in two ways. Firstly, from the point of view of meditative concentration on one's vocation and place in the World. Secondly, from the point of view of understanding and recognizing oneself as a small particle of the Universe, participating through actions in events of universal scope and, although only a grain of sand, having its own price and weight, as defined by Blaise Pascal: "Man is but a reed, weakest in nature, but a reed which thinks. It needs not that the whole Universe should arm to crush him. A vapor, a drop of water is enough to kill him. But were the Universe to crush him, man would still be more noble than that which has slain him, because he knows that he dies, and that the Universe has the better of him. The Universe knows nothing of this" [100].

What should an engineer believe in if he is not obliged to believe in God? To whom, then, should he pray in order to maintain his commitment to purpose and his awareness of his own place as a "reed which thinks"? And should Faith, as acceptance without

proof, be an element of the engineer's prayer? No, it shouldn't. It may be enough for an engineer simply to admire the Power that was not afraid to build the World in which we live and create – Time, Space, Matter and then life and Human. It is enough for an engineer to marvel at the Creator of Time, Space, Matter and their derivative – Human. An earthly engineer who creates a nut, a wheel, a car or an airplane can limit himself to worshipping the Creator of the Prime Causes in whose horizon his own life and creativity take place. And such worship is essential. It is also necessary to allow oneself to act, to be and to resemble in action that much greater Engineer who created everything – our whole World.

The engineer can address his prayer to the God he believes in. If the engineer does not believe in God, he can address his prayer to himself. In this way he gets rid of the fear of creating something great – something that will not always be perceived by other people but will serve them.

The engineer should allow himself to become superior than "just a human", just as every artist and every true professional does. However, there is no vanity or pride in this, as long as the engineer's role is properly understood. The doctor commands the patient, but in so doing he serves him. An artist, when painting a portrait, makes kings assume the pose he wants, but in so doing he serves the kings. It is the same with the engineer. He must allow himself to step back as "just a human" in order to serve Humanity.

The definition of prayer says about the connection with God. But it doesn't say with which one. No particular God is specified. My God is the one who molded this triune World – Time, Space and Matter – with filigree engineering precision and perfect thoughtfulness. He invented the laws (including gravity) that govern this World, but not God Himself, who created our world. Even gods cannot control this unimaginably complex World, in which there are only about 100^{100} elementary particles, which every second can give rise to the most diverse variants of combinations with each other in even more 100^{100} quantities, including the materialization in a definite Human consisting of about 30 tln cells and 100 tln useful microorganisms inhabiting it. But each of these simple living beings

is millions of times more complex than any factory, airplane or spaceship. Look around at this unimaginable complexity of Being and look at the sky, where there are trillions of galaxies alone. From these positions I am a believer, although I understand (this is my personal perception) that such a complex engineering Enterprise, as the World (engineering is not only materiality but also spirituality, morality and sociality arising from its material carriers), cannot have a single boss – director or manager. I am convinced that my belief will not offend anyone, just as I do not think that a believer in Allah offends those who believe in Christ or Buddha.

I have my own prayers, the main purpose of which is to constantly remind myself of my own smallness, even insignificance, in the vast Universe and at the same time to maintain the determination to be and create according to my destiny, perhaps given from above. God grants the most complex, difficult and impossible to achieve on earth only to those who are strong in spirit. Here are my prayers.

I

Let it be as I think, in keeping with Your will, O Lord.

II

With my thoughts, words, intentions, actions and deeds I create the Reality in which it is easy, comfortable and safe for me, my family and friends and everyone on planet Earth to live, work and study today, tomorrow, the day after tomorrow and the day after that.

III

I thank You, Lord, for everything.

I thank You, Lord, for having created Time, Space, Matter – Energy, Quantum Fields, Elementary Particles, Atoms, Molecules as well as the Laws of existence and development of this harmonious World,

in particular Gravitation, – all that we, people, today call the laws of physics.

I thank You, Lord, that Gravity gathered Matter into Stars and ignited them, gathered Stars into Galaxies and Galaxies into the Universe as the ultimate manifestation of the Creator's engineering.

I thank You, Lord, that Gravity gathered cosmic gases, stardust and rocks into the Solar System and ignited the Sun, created the planets and Earth, without which Life and living beings in all their biodiversity would not be possible.

I thank You, Lord, for creating Human, giving him Intelligence and guiding his development along the technological path.

I thank You, Lord, that the technological path of development has created human societies, nations, states, Humankind and Earth's Civilization.

I thank You, Lord, that thousands of generations of earthly engineers, in the image and likeness of Your Creation and within the framework of Your Laws, have created the modern engineering Civilization, passing from stone tools, the first fire and the wheel to the automobile, the computer and the spaceship.

I thank You, Lord, that our Earth's engineering Civilization gave birth to me, Anatoli Unitsky, and gave me the mission to become the World Engineer, honoring the Laws created by You.

I thank You, Lord, for what I am. For being able to think, feel, love, create, make, invent. For being able to breathe, see, hear, touch, smell, taste. For being healthy and happy. For becoming the World Engineer.

I thank You, Lord, that I have my Home – the Biosphere of the Space Home named Planet Earth, in which I, together with my closest relatives – billions of species of living organisms – live harmoniously.

I thank You, Lord, that I have a beloved Family, Wife and Children, beloved Relatives, Friends and Close ones, beloved Colleagues,

Supporters, Like-minded people and Investors, beloved Kin, Nation and Earth's engineering Civilization.

I thank You, Lord, for being able to create Unitsky's engineering schools: scientific, project, designing and manufacturing.

I thank You, Lord, for the fact I have a Tool for implementation of biospheric technologies that can save the Earth's engineering Civilization – Unitsky Group of Companies.

I thank You, Lord, for granting me the Mission – to save the Earth's engineering Civilization from degradation, extinction and death on planet Earth limited in size and resources through the substantiation and implementation of the Cosmic vector of civilization development in the Universe unlimited in Time, Space and Resources.

IV

I give myself permission to love and be loved.

I give myself permission to be perfectly healthy.

I give myself permission to be perfectly happy.

I give myself permission to experience an absolute joy.

I give myself permission to be a long-lived person.

I give myself permission to be a sage.

I give myself permission to be victorious in all my fights, battles and wars.

I give myself permission to be the savior of the Earth's Biosphere from the oppression of the Technosphere.

I give myself permission to be an outstanding founder.

I give myself permission to be the greatest creator.

I give myself permission to be a brilliant maker.

I give myself permission to be the most efficient engineer.

I give myself permission to be the most productive engineer.

I give myself permission to be the most abundant engineer.

I give myself permission to be the most successful engineer.

I give myself permission to be the most brilliant engineer.

I give myself permission to be a genius.

We, humans, are incapable of understanding and realizing the Universe created by God, neither now nor in the future, just as insignificant small parts are incapable of understanding the whole – the comprehensive World composed of them. Separate living cells are incapable of understanding and realizing the living organism of which they are a part, whereas the organism, if it has a mind, is capable of understanding the cells of which it is composed. I give myself permission to be the local messiah who came to save the Earth's engineering Civilization from degradation, extinction and death on planet Earth limited in size and resources, better than which, more beautiful and dearer to us, earthlings, there is and will be nowhere and never in the vast Universe.

The World Engineer
Anatoli Unitsky,
Minsk, Maryina Gorka,
April – June 2023

AFTERWORD

Global Ritual Sacrifice and Establishment of Engineering Civilization as Alternative Scenarios of the Future

When one speaks of human sacrifice, images of the bloody rituals of antiquity come to mind. It is believed that modern civilized and humane society has long ago condemned such savage practices. And that nothing of the kind can happen in the 21st century, unless as a gruesome crime. At the same time, the tendencies that are being discovered in the world and that lead, under certain events, to the most massive extermination of people in history in the course of nuclear war [101], can hardly receive a deeper elaboration than that through the matrix of sacrifice. No pragmatic approaches justify such a scenario. Only irrational faith can give hope for the establishment of a more perfect and just world order of the future as a result of total destruction.

The analysis carried out in this study demonstrates that human sacrifice has been and remains one of the main tools for maintaining the balance of the world system as well as an integral element of any significant civilizational shifts. It is such a shift that is taking place today – in the 20s of the 21st century. If we assume that it goes on in the same direction and in the same logic, in which all previous global transgressions have been made, the scale of sacrifice shall become monstrous. We can talk about disappearance (depopulation) of the majority of the Earth's population. Consideration of the ritual of human sacrifice as a system-forming and system-regulating tool of modern civilization allows us to make an attempt to search for alternative scenarios and models of its further development.

Origin of Sacrificial Ritual

According to the church, sacrifice is a sign of adoration of the deity, a sign of gratitude and submission. The origins of the ritual are found in primitive peoples. One of the most ancient forms of sacrifice is considered to be the so-called sacrifice of all first, i.e., sacrificing the first hunting prey, the first fruits and the first litter of herds as a sign of adoration to the supreme being. Outside the church tradition, the theory of gift, connected with the animistic concept of the origin of religion, is widespread. Such views were already expressed by the enlighteners of the 18th century, who believed that primitive people sought to please and propitiate the spirit or god, whom he represented by analogy with themselves and therefore offered him what the spirit or deity, as he thought, needed: food, sometimes clothes, weapons, jewelry or utensils [102].

There are other points of view on the origin of sacrifices. Some believe that originally sacrifice was not a gift or offering of anything to the god at all. Sacrifice was a form of communication between the members of the clan and the deity of the clan. The slaughter and eating of the sacrificial animal was a joint clan meal; the deity or totem of the clan was invited to participate in it. The god and his worshippers, as Robertson Smith wrote, usually ate and drank together, and by this sign their copartnership was declared and sealed. The most ancient sacrifice is the killing and eating of a totemic animal. From this the idea is developing that any sacrificial animal is sacred [102].

In atheistic literature, sacrifice is often interpreted through the theory of deception. It is argued here that "the custom of sacrifice was introduced by deceitful priests who invented this way of profiting at the expense of simpleminded people for their own profit. They demanded from tribe members to bring food or various useful objects under the pretext that it was necessary for spirits, ancestors and gods. This view was expressed by publicists and philosophers of the 18th century, and in modern times it was presented in a particularly simplified and crude form by the German popularizer of atheism Heinrich Eildermann, who tends to vulgar materialism" [102].

Summarizing the described approaches, we can distinguish several meanings traditionally invested in the rite of sacrifice:

- 1) gratitude and submission to a higher power;
- 2) gift brought to the higher powers in order to receive certain benefits from them, i.e., a kind of exchange;
- 3) fixation and maintenance of the established social hierarchy as well as the relationship between society and the deities it worships;
- 4) deception by the priesthood or ruling class to achieve their own pragmatic goals.

At the same time, the abovementioned can be relevant to a given situation both separately and together. It can also be assumed that as society becomes more complex, moving from the tribal system to the class system, the religious aspects of sacrifice (the above points 1 and 2) become less and less significant in comparison with the regulative-pragmatic ones (points 3 and 4). "The further the process of internal decomposition of the primitive community went, the more the contradictions of interests of, on the one hand, wizards, sorcerers, fortune-tellers, shamans, later priests and, on the other hand, the masses of "common people" were revealed in it. This is where deceit and extortion began to appear, and the further, the more so. Although the attempts of some former authors, especially propagandists-atheists, to reduce all sacrifices to "priestly deception" suffer from extreme simplification of the problem, the facts of such deception cannot be denied. After all, it is not without reason that one of the prominent modern ethnographers, the American Paul Radin, studying the early forms of religion, came to the conclusion that all these primitive beliefs, magical practices, sacrifices and so on are the work of "religious formulators" – shamans and priests, for whom religion is a tool used for economic exploitation. It was to a large extent so. Siberian shamans, treating people or livestock, demanded blood sacrifices to propitiate the spirits; they took part of the sacrificial meat for their own benefit. Some shamans lived by this, not having their own household" [102].



It is generally believed that “the custom of sacrifice – as an essential component of religious cult – developed from several different roots, connected with different aspects of the life conditions of primitive society: from the specificity of the primitive hunting economy (and later the agriculture and cattle breeding that replaced it), from the structure of the primitive community itself, from intertribal clashes, from funerary customs” [102].

From the psychological point of view, the prerequisites for the emergence of human sacrifices can be seen in the specifics of humans’ perception of their own mortality and the death of their neighbors. The beginning and the end, birth and transition to another world have always been beyond the direct influence of human. Murder (whether it is the killing of an animal or human beings) is a violation of the existing order of things. In realizing this, already on a primitive level, one should develop an idea of the criminality of such an action, which seems to encroach on the subject world, organized by some other forces, higher and more powerful in relation to a human. And if this sense of crime arises, then the fear of punishment also appears. Probably, the rite of sacrifice was initially supposed to help to avoid punishment. That is why the first hunting prey, the first litter and the first harvest were sent to the altar. This was a kind of a bribe to the policeman or a tax to the ruler at the level when natural incomprehensible and powerful elements were perceived as such.

In a similar vein is the reasoning of the French philosopher Georges Bataille [103], who analyzes sacrifice through the categories of subject-object relations as well as transcendence and immanence. The essence of these relations “is the removal of the object through its destruction from the relations of consumption. The object is endowed with exceptional qualities in relation to other things, which not only reproduces the original dualism but also represents it or even creates it at the level of relations with the sacred and social relations” [104]. In this sense, the coordinated terrorist suicide attacks of September 11, 2001 were an act of sacrifice in the precise sense of the phenomenon according to Bataille as bearing the counter-meaning of the total trend of Americanization

and globalization. An important aspect of Georges Bataille’s definition is that the sacrifice is taken away as a useful thing, i.e., included in relations of production and distribution, and hence of power [104].

In the process of sacrifice, according to Bataille, human is able to return to the state of immanence – identification with nature and, consequently, with the sacrifice. By removing the victim from the world of objects and endowing it with special qualities, the relation of subordination between the murderer and the murdered, which arises in the context of consumption, is dissolved. The human being becomes equal to the sacrifice, like an animal, because “when one animal eats another is always the fellow creature of the one that eats. It is in this sense that I speak of immanence. I do not mean a fellow creature perceived as such, but there is no transcendence between the eater and the eaten; there is a difference, of course, but this animal that eats the order cannot confront it in an affirmation of that difference” [103]. On the other hand, in addition to returning the person to the state of immanence and along with the attempt to propitiate the real master of the sacrifice, the relationship of the sacrificer with this master was apparently established.

If we consider sacrifice not only in its utilitarian sense as a waste, as Georges Bataille did, but also in its religious dimension as a gift, then the giver occupies a higher position than the victim. In such a ritual, power is enacted and consolidated. And the highest power available to human, in the primitive dimension, was to be consolidated as dominion over the life of another person. In this action in honor of the deity, human comes as close to the deity as possible. Unable to give life and fully dispose of it, forcibly terminating it to please its true master in the rite of sacrifice, the murderer, as it were, participates in the act performed by the deity, comes as close as possible to the deity, to the point of self-identification with him. Georges Bataille describes such an attitude in the “priest – sacrifice – deity” connection as follows: “When the offered animal enters the circle in which the priest will immolate it, it passes from the world of things which are closed to man and are nothing to him, which he knows from the outside – to the world that is immanent to it, intimate,

known as the wife is known in sexual consumption (consummation charnelle). This assumes that it has ceased to be separated from its own intimacy, as it is in the subordination of labor. The sacrificer's prior separation from the world of things is necessary for the return to intimacy, of immanence between man and the world, between the subject and the object.

The sacrificer needs the sacrifice in order to separate himself from the world of things and the victim could not be separated from it in turn if the sacrificer was not already separated in advance. The sacrificer declares: "Intimately, I belong to the sovereign world of the gods and myths, to the world of violent and uncalculated generosity, just as my wife belongs to my desires. I withdraw you, victim, from the world in which you were and could only be reduced to the condition of a thing, having a meaning that was foreign to your intimate nature. I call you back to the intimacy of the divine world, of the profound immanence of all that is" [103]. Thus, the sacrifice, being excluded from the cycle of consumption, returns the victim to the state of harmony with the world as a certain order, and at the same time it consolidates the relationship of the victim with the entity that established this order by removing the contradiction between the subject and the object, acting as a mediator between the human and the divine and, consequently, being the basis for building and consolidating the hierarchical order within society.

In the book "Totem and Taboo" Sigmund Freud hinted that not only sacrifice but culture in general originated from the guilt felt by primitive human for killing his own father. According to the Austrian psychoanalyst, religion and culture arose from the fear and trembling caused by the killing, cutting, roasting and devouring of the most precious thing a creature endowed with faith and reason can have – its own parent [105]. In his conclusion Freud relied not only on the associations of the neurotics he analyzed. From the works, in particular, of James Frazer, it is known the tradition of sacrifice of the old king – the leader, who was unable to further ensure the welfare of the people ("Akela has missed"), was solemnly killed and replaced by a young one. The peoples of the Far North, until recently, left infirm old men in the taiga and tundra to be torn apart by beasts [106].

Apparently, the edifice of any hierarchically organized society, i.e., a society divided into estates, classes or strata, between which relations of domination and subordination are established, is constructed around the ritual of sacrifice. Some ethnographic studies suggest this. In particular, New Zealand anthropologists Joseph Watts and Russell Gray from the University of Auckland studied the practice of human sacrifice among representatives of 93 Austronesian nationalities and cultures living on a large territory from Madagascar to Easter Island. The scientists tried to establish a connection between the prevalence of bloody fratricidal rituals and the form of political organization in the community. They divided them into three groups:

- societies of equality;
- societies where power is elective;
- societies where power is assigned to a particular group and then passed on through inheritance.

"Human sacrifices took place in 40 of the 93 cultures studied (43 % of the total), including five of 20 (25 %) egalitarian, 17 of 46 (37 %) societies with a "temporal" and 18 of 27 (67 %) with an "innate" hierarchy" [107]. The difference was so significant that Watts and Gray had to assume that human sacrifice in primitive tribes was a tool to consolidate the dominance of some over others, and the introduction of bloody practices correlates with the transition of society from a political model of equality to one or another type of hierarchical organization.

Freud's conjecture and anthropologists' data suggest that sacrifice, at least historically, is the basis for the formation of any complex social system. Relationships with higher powers and subordination within groups are built around bloodshed. Blood (or bloodless sacrifice) fixes the most significant decisions – the beginning of hunting or military campaign, coronation, wedding. The sacrifice marks all major stages in the life of a person and a community – birth, initiation, the beginning of sowing or harvesting, death and funeral. In particular, the famous gladiatorial fights arose from a tradition associated with burial. "Before becoming an infamous circus spectacle,

the “games” of gladiators were – first among the Etruscans and then among the Romans themselves – a type of funerary sacrifice” [102].

A superficial look at civilizations, or rather at the way they represent their own emergence, gives confirmation to the assumption of the fundamental role of sacrifice in the processes of cultural genesis.

“The first human sacrifice in the history of Hinduism was the first man Purusha. The Rigveda, one of the world’s oldest religious texts, composed in the 2nd millennium B.C., tells how the gods sadhyas (lower gods) and rishis (divine sages) sacrificed Purusha and created the world from him...

One of the Rigveda’s hymns describes in detail how the four varnas of the Indian caste society were created from the body parts of the first man: the Brahmans, of course, were born from the head of Purusha, the Rajanya, or Kshatriya warriors, from the hands, the Vaishya traders from the hips, and finally the Shudra servants from the feet. From the other parts of the body the sky, sun, earth, wind and other useful elements of existence were created. The airspace was created from the navel, and the gods Indra and Agni from the mouth. The spirit of Purusha, from which, strange as it may seem, such a material body as the moon was made, was not wasted. Lastly, from his ear, on the contrary, such abstract concepts as the sides of the world were created. Besides, other immaterial realities have also sprung from this sacrifice” [108].

The Chinese trace the lineage of everything back to their version of the first man named Pangu. Giant, he divided and fixed heaven and earth in their places and then lay down to rest to perish and give rise to all that surrounds us. The air from his chest became wind. The flesh became soil, the bones became stones, the hair on his body became plants, the hair on his head became stars, the sweat became rain, the eyes became the sun and the moon, the voice became thunder, and the tears became the waters of the Yellow River.

The amazing myth of Prometheus, who gave fire to people and thus sacrificed himself, forms one of the foundations of ancient Greek civilization. Further, Christian civilization considers its beginning

to be the God’s sacrifice of his consubstantial son, Christ. This atones for the sins of humankind and opens the possibility of salvation and eternal life. Finally, when Christianity slowly begins to lose its position in Europe, when a new version of the great social model – New European civilization, capitalism, consumer society – is formed, then Friedrich Nietzsche speaks of the death of God as the foundation on which the new world is erected. “God is dead! God remains dead! And we have killed him! How can we console ourselves, the murderers of all murderers! The holiest and the mightiest thing the world has ever possessed has bled to death under our knives: who will wipe this blood from us? With what water could we clean ourselves? What festivals of atonement, what holy games will we have to invent for ourselves? Is the magnitude of this deed not too great for us? Do we not ourselves have to become gods merely to appear worthy of it? There was never a greater deed – and whoever is born after us will on account of this deed belong to a higher history than all history up to now!” [109].

In the world of economics and politics, the death of God, his sacrifice, was embodied in the secularization of church wealth. Everywhere, land and worldly power were taken away from clerics, up to the physical murder of priests, the destruction of churches or the rebuilding of churches into planetariums and vegetable stores, as was the case, for example, in the USSR. Objectively, the ritual murder of God was accompanied by a mass of human sacrifices at the hands of the Holy Inquisition as well as in religious, civil, colonial and later ideological wars. Throughout human history, almost until the end of the first quarter of the 21st century, sacrifices (including human ones) have always occupied an important place among social practices and events.

Ritual Murder in Antiquity

In popular culture, human sacrifice is, for example, the footage of a severed Indian head rolling down the steps in the valley of the Lambayeque pyramids and falling into a pile of other heads.



Others think of the story of the Old Testament Abraham, who was ordered by God to kill his only beloved and long-awaited son. Admirers of ancient culture will imagine Sophocles' description of the ritual murder of Priam's daughter Polyxena in honor of Achilles, who had fallen in battle. All these repeatedly quoted artistic images have confirmation in historical science. Archaeological excavations testify: traditions of human sacrifices arise almost simultaneously with the emergence of *Homo sapiens* as a species. There are reasons to believe that cultic killing of their own kind was practiced even by Neanderthals.

"The remains of about 20 Neanderthals have been found in the Krapina Cave in Croatia, with bones charred and shattered and skulls badly damaged. Some scientists are inclined to think that the inhabitants of the cave were not just treating the brain but committed a religious ritual and that two dozen Neanderthals were killed for ritual purposes. Such rituals in new age savages are usually explained by the desire to join the life force of the enemy. And the crushing of bones could be related to an attempt to prevent resurrection.

A similar finding was made on the island of Java where in the sand and gravel deposits, the age of which is over 100,000 years, were found 11 skulls with crushed facial parts but without skeletons. It is noteworthy that neither lower jaws nor teeth in the skulls were also found.

Scientists from the University of Michigan Stanley Garn and Walter Block, having studied the properties of human meat, came to the conclusion that any cannibalism, as a rule, should be regarded as ritual, because humans are very much inferior to herbivorous animals in terms of nutrition. Neanderthals lived in times when there was no shortage of either mammoths, antelopes or fat and tasty rodents, and people hardly had to suffer from hunger. Therefore, even if once some particularly hungry Neanderthal decided to eat his own kind, the mass finding of perforated skulls and charred human bones could be explained more by ritual reasons.

And in any case, ritual reasons explain the discovery made in the vicinity of Rome, in the grotto on the mountain Monte Circeo. They found the skull of a Neanderthal with almost completely

removed occipital bone. The owner of the skull had been killed by a blow to the temple. Bones of bison and deer were piled up in the corners of the grotto, and a circle of stones was laid out around the skull. Vladimir Kabo writes: "There is a speculation that the animal bones are the remains of a funerary feast and that the complex as a whole is the result of a ritual murder committed 55,000 years ago" [108].

Mass graves of remains of people who died violently under mysterious circumstances have been found in various places on the planet. Not only primitive savages but also representatives of developed civilizations of the Ancient World were not strangers to ritual murder. Egypt, China, India, Western Asia, Phoenicia, Ancient Greece and Rome, pagan Europe and America – everywhere in one form or another traces of atrocities justified by some tradition and relevant considerations are found. However, most likely, these seem to be atrocities only today. Back then, on the contrary, sacrifice was portrayed as a virtue. In many cultures people voluntarily went to death for one good or another. In Egypt, where the remains of hundreds of people who did not die of their own accord were found near the tombs of the pharaohs, "until the end of the Old Kingdom (approximately until the 23rd century B.C.) no harm threatened the deceased Egyptians and no one even needed the patronage of the gods behind the coffin – they are not depicted on the walls of ancient tombs. The human who managed to get into the afterlife by any means and by any injustice, remained forever to lead there a trouble-free existence. Therefore, it cannot be excluded that the servants voluntarily followed their masters, preferring the short-lived earthly life to eternity behind the coffin, even if it meant dying – because the second such opportunity might not have been given again" [108]. In India for a long time a wife had to follow her dead husband to the pyre. If this did not happen, such a woman became an outcast and her life was unenviable.

The rituals, impressive in their luxury and scope, were carried out, judging by the findings of scientists, in Sumer. "The noble Sumerians, equipping themselves for the final journey, were not going to deny themselves any earthly pleasures. Their tombs, sometimes consisting

of several rooms, are spacious rooms made of brick and stone, which was brought from dozens of kilometers away. Archaeologists find here luxury items: musical instruments, sets of board games like checkers, vases, animal figures sculpted from precious stones... Next to the men lie daggers of fine work, patterned spears... Noble ladies took with them a huge amount of jewelry and cosmetics... And naturally, the Sumerian rulers did not want to do in the afterlife without their servants and courtiers. But the archaeologists were amazed by the fact that these servants, apparently, dared to accompany their masters voluntarily. There are no signs of violent death on their bodies, and they are buried, as a rule, in the most relaxed poses.

The tombs of the kings of the First Dynasty of Ur (who ruled in the middle of the 3rd millennium B.C.) resemble not a tomb but feast halls, which the breath of death touched unexpectedly for all present. It seems that the musicians continued to play harps until the last moment, and the ladies – to entertain their queen with cheerful conversation. Moreover, these ladies were not slaves thrown into the grave for the afterlife service but dearly dressed women, decorated with gold and stones, apparently rich and noble. There is a version that the servants and courtiers of Sumerian rulers voluntarily descended into luxurious crypts, in order to continue their prosperous existence in the next world. They took a narcotic poison, which relieved them of the anguish of death, and fell asleep forever to the music of the same voluntary suicide-musicians, or they were stabbed in their sleep with an instant and painless blow of a stiletto" [108].

The above is only part of the diverse history of human sacrifice in antiquity. Official science, or rather mass ideology, inculcates the notion that such rituals are a thing of the past. That the religions of the world have moved from real bloodshed to symbolic forms of such action. And that today practices like the one described above, if any, exist only as a horrifying form of deviation. This is the version accepted by most. There is also an alternative view. Its meaning is that human sacrifice has been and remains a real and essential instrument of legitimizing the power of the ruling estates as well as a gift and a way of receiving goodwill from the higher powers to which

they are subordinated. Naturally, the forces themselves bear little resemblance to archaic gods, and the instruments of murder are not the copper knives of priests. However, this does not change the essence. Sacrifice, as some researchers believe, has been and remains the fundamental beginning of any culture and civilization, including modern Western civilization, which claims to be a global system of values and guidelines.

After the loss of religious dimensionality, sacrifice should be seen in three other dimensions. At the level of the collective and individual unconscious – as an archetype ordering experience. At the level of individual and collective consciousness – as a kind of substitute algorithm that allows redirecting violence from significant and valuable objects to less important ones. And at the operational level – as a regulatory mechanism that holds, consolidates and contributes to the preservation of the existing social order.

Sacrifice Is an Unbroken Tradition

The weakening significance of sacrifice as a ritual and filling in the relationship between human and the higher powers does not diminish the importance of sacrifice in the formation and maintenance of the social order foundations. This includes the consolidation of the social hierarchy established at this or that stage. It is through sacrifice as a form of appropriation and transfer of property that some people can rise above others at a fundamental level. It is also through sacrifice that the human species asserts itself as something superior to animals, plants and other forms of life.

“Ritual sacrifice is no less a part of contemporary society than it was ancient Greek society. One important difference is that while the ancient Greeks may or may not have actually engaged in human sacrifice, contemporary capitalist society definitely does,” argues Hampton University researcher Nick Partyka [110]. Sacrifice in the capitalist system of consumer society, as in previous formations, is a way of maintaining hierarchy. In this case, the basis of its construction is the dichotomy of rich and poor, within which there

are many levels and sublevels from poverty to superstates of the ruling “elites” in the world.

“The Communist Manifesto” by Karl Marx and Friedrich Engels says: “The history of all hitherto existing societies is the history of class struggles. Freeman and slave, patrician and plebeian, lord and serf, guild-master and journeyman, in a word, oppressor and oppressed, stood in constant opposition to one another, carried on an uninterrupted, now hidden, now open fight, a fight that each time ending in a revolutionary reconstitution of society at large, or in the common ruin of the contending classes” [111].

Despite the fact that modern sociology has a plethora of approaches alternative to the Marxist’s one to the understanding of society and the transformations that drive its historical changes, this thesis is difficult to dispute in and of itself. Today, as at the dawn of humanity, there is a multilevel hierarchy in which higher positions are occupied at the expense of those below, who are literally or figuratively sacrificed for the sake of profit, status or power. Sacrifice is conceptualized here in other categories, but its essence remains the same as it was long ago.

“Capitalist society chooses, almost from birth, those it will subject to the kinds of social and material pressures that drive people to crime in order to meet their needs, either for material resources or for social status. Then, after some of these people succumb to the pressures and incentives arrayed before them, capitalists utilize their power to organize public rituals of sacrifice, or as we call it, the criminal justice system. Capitalist elites intentionally disinvest in public social services, e.g. education and healthcare, then when people find it impossible to live with dignity, they resort to any means necessary to provide. Capitalist elites criminalize this behavior, then apprehend, try, and if convicted, punish those who refuse to accept the social station assigned them. One grotesque example of the comedy of guilt in this connection is the widespread criminalization of homelessness” [110].

Just as it was customary in ancient rites, the victim must accept its fate. It must step to the altar itself. To do this, a much more elaborate and costly comedy is played out than the ancient Greeks’ one,

as example (although they were quite inventive). The problem the Greeks had to face "was that the idea of a cow, sheep, ram, or pig consenting to be sacrificed by a human in the name of a God is laughable. Humans and animals possess no reliable means of communicating, especially for such a complex notion as ritual sacrifice. Moreover, even if a machine enabled humans and animals to communicate, it is by no means clear that we could sufficiently explain to them notions like God and ritual sacrifice for them to make a suitably informed choice that could alleviate humans' guilt. Thus, the Greeks made use of the comedy of innocence to resolve their feelings of guilt at killing an animal they have raised, and have a relationship with, and stands in symbolically for humans. As we saw above, this process would occur at the beginning of the sacrificial ritual. The human participants would stand in a circle, water would be brought in a vessel, and there would be a ritual washing of hands. Water would then be offered to the animal, or perhaps sprinkled on its head, inducing the animal to make a gesture that the humans could interpret as it giving its assent to be sacrificed. In another variation of this process a select few animals might be arrayed around the altar, upon which were placed some food items cows would find hard to resist. The first animal to move in for a taste of the treats displayed before it could then be interpreted as assenting to be sacrificed. Since the animal could be said to go "voluntarily" to the sacrificial altar any feelings of guilt the Greeks had would be assuaged" [110].

The consent of the victim is necessary to alleviate or remove the guilt of the one who commits the murder. More importantly, without it, the ritual cannot be conceptualized in terms of giving. In order to give something, that something must belong to the giver. The consent of the victim to go to slaughter is the giving of oneself to another, who is giving the life of an alien as belonging to him. Other mechanisms for acquiring a right to someone else's life are purchase or capture. They were also common. For example, among the Khonds "for a long time there was a rite of voluntary sacrifice to increase the harvest. The community bought a person's consent to die, and sometimes parents sold a child for this purpose, after which he could live for many

years and even marry and have children. But when it became necessary to take care of the crops, the victim was consecrated, identified with a deity, and then drugged with opium and strangled. The body of the victim was cut into many pieces, which were buried in the ground all over the surrounding fields" [108]. This was also done with captives. For example, "the warlike Aztecs in Mexico brought to a great extent the practice of human sacrifices to their cruel gods – Huitzilopochtli and Tezcatlipoca. In order to have a constant supply of human material for these sacrifices, they waged frequent wars with their neighbors for captive taking. These sacrifices were required especially for the "sun" god Tezcatlipoca. It was believed that the sun, without receiving enough of them, would cease to shine brightly. The Spanish conquistadors who were not soft-hearted people themselves were amazed at the sight of a tall pyramid of human skulls in Tenochtitlan – the remains of sacrificed...

In essence, the entire history of the Israelites' wars of extermination for the possession of Palestine in the late 2nd and early 1st millennia B.C. falls into this category of cruel military customs – extermination of enemies for the glory and at the request of their god. In the Bible these wars are described as a direct command of Yahweh, who, ordering his people to conquer city after city, insistently repeated the requirement not to leave alive a single person, regardless of sex or age (Joshua, VI, 20; X, 28–43; etc.). Such mass human sacrifices, made at the unconditional demand of God, the world history, it seems, has not yet known" [102].

Captives were killed both directly to please the higher powers and as part of burial rituals. On the territory of China in Anyang a burial of local rulers was found with a total area of about 380 m². The remains of hundreds more people were found near the remains of the rulers. Apparently, servants. "And outside the whole cemeteries were stretched: graves of decapitated prisoners of war with their hands tied behind their backs. Thousands of their heads were buried in separate pits.

The fact that the victims were mostly prisoners of war is evidenced by the analysis of their remains: while the sponges themselves, found in ordinary graves with equipment and weapons, were characterized

by anthropological homogeneity, in the sacrificial burials people of various nationalities can be found. Slave labor was not yet massively used at that time. Apparently, guarding and feeding many forced laborers was not always profitable, but it was always dangerous. There is evidence that captives could be used for some labor-intensive one-time work: construction of giant tombs, elimination of floods' consequences, but then sooner or later they were killed in order to please the ritual, and perhaps for lack of need. Captives could also be involved in spring agricultural work, after which they participated in fertility rites and were sacrificed as part of the ritual of "sacred marriage". The following inscription from the Shang era is known: "Wang commanded many Qians to perform fertility rites in the fields" [108].

However, in a modern humane society, neither people trafficking nor the taking of captives as property on the battlefield are common. Therefore, human sacrifice can only be placed at the disposal of the ritualist voluntarily, for which modern capitalist society has created amazingly ingenious tools and mechanisms. To begin with, it is necessary for people to accept only a few statements as unconditionally true. The education system, influential international organizations like the UN as well as the mass media and mass culture work harmoniously on this. The truths are roughly as follows:

- democracy is the best possible form of political organization;
- capitalism is the most perfect economic system;
- ecology is the supreme value of the modern world;
- human habits and actions have a decisive influence on the state of ecology;
- to restore ecological balance in the world, it is necessary to reformat the nature of production and consumption while preserving capitalism and democracy.

What can unquestioning acceptance of these ideas lead to?

1. Power should remain alternating through elections, which, with an eye to capitalism, means that power is controlled by capital, which finances any election campaigns and, as a consequence, is able to put the right people in key positions to achieve the desired results.

2. Capital should continue to accumulate in the hands of a small group of people who gain more and more real power, which is enshrined in appropriate agreements and legitimized through democratic procedures.

3. Big capital is given the opportunity to dictate its terms and impose unfavorable rules of the game for competitors through the environmental agenda with various quota systems, restrictions and global eco-technological trends, which require additional production costs and thus prevent new players unable to withstand environmental burdens from entering the markets.

4. People should massively refuse to own anything as an unsustainable way of consumption. The objects of the material world must be exploited as intensively as possible and incorporated into recycling systems. Food, clothing, transport, housing, entertainment – everything should have the character of industrial capitalist flow production, in which people will use an object only for a short time and only partially, and then return it to the production-consumption chain. Food waste, worn-out clothes, worn-out cars – everything should be recycled, as if rented out. Consumption and production should become inseparable elements of a single system in which the human being is an object among other objects.

5. Classical capitalism (as described by Karl Marx) exploited human labor by appropriating the surplus value of the product manufactured. The new capitalism will exploit human as capital – exploitation reaches the absoluteness of its manifestation. The consumer becomes an active accomplice in production. The capitalist will sell the product, thereby compensating for the costs of production, and through recycling systems significantly reduce the costs of raw materials. In classical capitalism, profit equals the market price of the product minus the cost of raw materials, equipment and worker labor. In the new capitalism, labor and raw material costs will be greatly reduced through automation and reprocessing. However, this does not lead to higher profits. On the contrary, due to environmental burdens, social burdens on business and, of course, over-saturated markets, the profits of the new capitalists have a steady

downward trend. At the Davos Economic Forum and in the writings of its head Klaus Schwab, this model is called inclusive capitalism. The systematization cited by the researchers suggests a number of innovations. "First, profit should cease to be the goal and the main benchmark of business success. Second, companies should go after consumers by lowering prices and thus gradually eradicating poverty and misery. Third, we should abandon the usual notion that corporations are owned by shareholders, who are the main (or even the only) beneficiaries of corporate activities" [112]. It is believed that in such a configuration business will become more flexible. More importantly, such a business will not indirectly, but explicitly take over the functions of the state. The further it goes, the more so. Profit is exchanged for power. And this exchange does not look like a loss for capitalism, on the contrary, it seems to be a more direct road to what we want. People will become part of capitalism not only in body but also in soul, they will accept it wholeheartedly and subordinate themselves to the interests of the corporation, as it is assumed, for example, in the Japanese model of collective capitalism. The corporation will take care of people as a shepherd takes care of a sheep, and with their consent will sacrifice them when it becomes necessary.

Where the ancients situated their comedy at the beginning of their sacrificial ritual, we moderns place our comedy at the end of our sacrificial ritual. Accepting the truths dictated by capitalism as such, people endorse the rules of the game, also accepting the role of the victim (if necessary). At some point, finding themselves homeless and unemployed, finding themselves in the dock or in a trench on the front line, they no longer have any right or will to protest. They lived, consciously or not, as part of that society, of that system, which decided to sacrifice them. So, it was their own choice. The hopeless media agenda and the dystopian image of the future created by Hollywood, the authoritative statements of science about the doom of everything in the world, including even the planets and stars, soften the bitterness of parting with life. Murder continues to be justified and legitimized as a civilized phenomenon rooted in tradition and justified by absolute necessity.



Ritual Consciousness in the Context of the 21st Century

Human sacrifice is one of the historically established forms of violent elimination of people and social groups, a method of killing that is fixed and normalized from the point of view of a particular civilization. In total, there are five such forms of killing:

1) duel. Legitimized in the context of the dueling code, it is committed in interpersonal relations and serves to achieve personal goals such as honor, revenge, power, etc.;

2) war. It is committed in interstate relations for the sake of pragmatic goals – wealth, fame, power, in fact being the murder of some people by others in the interests of the state;

3) execution. It is conceptualized strictly in the legal field, serves as a punishment and a means of eliminating members of society who pose a danger to other people or to the social formation shaped in this or that period, including the power hierarchy, economic relations, the system of norms, values, etc. It is committed in the relations of the state and the individual; in fact, it is a murder by the state of the individual;

4) terrorist act. As a rule, it has a political or ideological coloring and is a means of expressing the will of a group of people. It arises between states, opposing political or ideological groups or between states and opposing groups of fighters, in essence being the murder of some people by others, sometimes suicide (voluntary self-sacrifice), in the interests of one or another political or ideological doctrine;

5) ritual murder. It is intended to regulate the relations of a person or society with this or that entity accepted as the supreme reality. It arises in the relationship between a person or society and the supreme entity, in essence being the killing of human by human in the interests of the supreme entity to which this killing is dedicated.

The main difference between the described forms of “civilized” murder, as it appears, lies in the space within which it is committed,

in the interests it pursues as well as in the specificity of the subjects and objects involved. In reality murder can combine the characteristics of different forms. For example, war can be conceptualized both as a duel and as a sacrifice. Such a big event affects all spheres of social life – from interpersonal relations to relations with divine forces. That is why ideologues try to present almost any war as sacred. Only in this way can murder, as stated earlier, be fully justified in the end. If the murder is committed in the interests of a higher reality, the conscience of the murderer is kind of clear. Sometimes everything is formalized and done as a sacrifice from the beginning. Sometimes the rethinking happens *ex post facto*. Be that as it may, but in all cases wherever the leaders of society decide that someone must be killed, wherever civilized society deems it necessary to violently put a person to death, everything is framed and conceptualized as a sacrificial ritual.

Ritual can be defined as “a way of behavior, which is a repetition of all actions that once led to a positive result, and the consolidation of these actions (according to Konrad Lorenz). It is a projection of myth into action. Since it is unknown which action from the whole sequence caused the desired effect, the most effective will be the fullest possible repetition of all of them, which is the case in traditional cultures, the life of the bearers of which is almost completely ritualized. The spread of rituals is as wide as that of myths. Moreover, ritual forms of behavior are present in most higher animals (rituals of courtship, aggression, territorial and dominant behavior)” [113].

Rituals are preserved in great variety in the culture of the 21st century. Everyone can choose examples to their taste. Rituals accompany people throughout their lives, marking bright and significant events such as meeting with flowers at the maternity hospital; celebrating a birthday by blowing out candles and making a wish, which must not be told to anyone in order for it to come true; a graduation party; a wedding; a funeral, which is organized by a ritual service bureau... These algorithms of actions have a great weight in the culture and continue to be taken by most people with utter seriousness.

Rituals exist in all spheres of human activity – in production, art, science, trade, services, agriculture, politics and others. They perform an important function to standardize the processes of interaction between people. In this case, rituals, on the one hand, clearly fix the established hierarchy and the corresponding distribution of roles, on the other hand, act as a means of legitimizing changes, the acquisition of new statuses and in general any transition to a qualitatively new state or a new stage of life, relative to both each individual and society as a whole.

Achieving the desired result with the help of ritual implies the need to perform a certain set of symbolic actions. The full power of such an action in the process of its performance is mediated by the symbols used and enhanced by the entourage – the plasticity of the action, odors, light and sound design. Intuitively, it is expected that the more powerful the symbols used, the greater the effect that can be achieved. That is why human sacrifice rituals were performed only on the most important occasions, requiring maximum energy, for example, before an important battle, the outcome of which depends on the survival of the people, or during the burial of the ruler, for whose well-being in the next world the subjects are ready to do everything in their power.

In the 20th and 21st centuries, rituals of human sacrifice can be seen in many institutionalized practices such as penal and migration systems, armed conflicts as well as in the structures that constitute the financial and banking sphere, medicine and others. For some members of society to remain at the social summits, they continue to sacrifice other members of society both locally and globally, where the well-being of some countries is achieved at the expense of oppressing and exploiting others. Various forms of ritualization of killing in society serve to justify sacrifices when other legal forms of killing (duel, war, execution or terrorist act) are inapplicable or insufficient. For example, in a situation where war cannot be justified in the public mind only in terms of economic expediency, it is justified as a sacrifice to be made in the name of democracy and freedom. In reality, however, it remains clear that in capitalist reality this is only a cover for achieving pragmatic interests.

Artificial Armageddon – the Prospect of the Most Massive Human Sacrifice

In a capitalist society of mass production and consumption, sacrifice can be seen as a form of consumption. In this perspective, it is “a consequence of the a priori existing differentiation in the consumption of different social strata. Jean Baudrillard distinguishes two main functions of the social: the function of producing a certain surplus (demographic, economic or linguistic) and the function of eliminating it. The latter is connected with defense mechanisms – if the surplus were redistributed, it would, in his opinion, inevitably destroy social order and use value. Thus, sacrifice stands as the oldest way of eliminating surplus. Marshall McLuhan speaks in this regard of the culture of potlatch, an ancient practice of redistribution of wealth, in which huge product’s surpluses have to be destroyed or class differences would arise that would ruin the traditional social order (smashing buildings, leaving tons of rice exposed to rain, etc.)” [114].

To quote Jean Baudrillard in full: “This reversion of wealth, of all wealth, which formerly was effected by sacrifice which left no room for any accumulation of remainders, is intolerable to our societies. It is by this very fact that they are “societies” – in the sense that they always produce a surplus, remainders – whether it be demographic, economic or linguistic – and that these remainders must be cleared up (never sacrificed, that is too dangerous: but purely and simply got rid of). The social exists on the double basis of the production of remainders and their eradication.

If all wealth were sacrificed, people would lose a sense of the real. If all wealth became disposable, people would lose a sense of the useful and the useless. The social exists to take care of the useless consumption of remainders so that individuals can be assigned to the useful management of their lives” [115]. Thus, Baudrillard emphasized that in the capitalist world, sacrifice, while remaining as a practice, loses its sacred meaning, turning into a simple liquidation for the sake of preserving the established order – a potlatch.



“Potlatch is very widespread, especially where there is ease of food-gathering or food-production. For example, among the Northwest coast fishermen, or rice-planters of Borneo, huge surpluses are produced that have to be destroyed or class differences would arise that would destroy the traditional social order. In Borneo the traveler may see tons of rice exposed to rains in rituals, and great art constructions, involving tremendous efforts, smashed” [116].

Along with the conceptualization of sacrifice as potlatch, it is worth recalling again Georges Bataille’s concept, according to which sacrifice is different from potlatch, although similar to it as two forms of ritual “expenditure of wealth”. We can even say that Bataille’s concept of sacrifice breaks with the age-old tradition: sacrifice is made in the absence of any deity, it is entirely immanent, not addressed to any other subject, its essence is the liberation of things and, indirectly, of the person who refuses to use them: the sacrificial ritual seeks to destroy the thing – and only the thing – in the sacrifice [117]. In relation to a consumer society, sacrifice would be an anti-consumption, performed by the priests to maintain balance in the same way that positively and negatively charged particles, matter and antimatter balance each other. For this reason, the number of sacrifices increases in direct proportion to the amount of consumption, and the more monstrous the scale of one, the more horrifying the other.

“Sacrifice is the antithesis of production for the sake of the future, it is the extermination of wealth, which is of interest only for the moment. In this sense, to sacrifice means to give and to leave, but only the gift cannot become for the recipient an object of preservation; in giving something as a sacrificial offering, we hand it over to the world of transient annihilation. This is what it means “to sacrifice to the divinity”, whose sacred essence is like fire. Sacrificing is like throwing coal into a furnace” [117].

If we follow Georges Bataille’s idea that sacrifice is the removal of the object from the world of consumption and thus a means of returning human to the state of immanence with nature, it can be interpreted today in the following way. The “elites” find themselves in rigid antagonism with the natural world. This antagonism is currently

expressed as a global ecological crisis. To remedy the situation, the ruling “global elites” must remove some people and objects from the world (through depopulation and deindustrialization) and sacrifice them in order to return to harmony with nature. Prince Philip, the husband of Queen Elizabeth II, one of the representatives of the ruling “global elite” and ideologists of the reduction of the world population, frankly did about it. Talking about his rebirth, back in 1988 he said: “In the event that I am reincarnated, I would like to return as a deadly virus, to contribute something to solving overpopulation” [32]. Since the meaning of the real elite should be the opposite as the value approach is based on the original meaning of the word “elite” (i.e., “the best”), the concept of “global elite” in this study is taken in quotation marks and further it will mean the same as false, pseudo- or quasi-elite (they are all self-appointed because they did not pass final exams, they were not chosen or appointed by anyone).

The interpretations of sacrifice through the metaphor of spending (potlatch) and as the removal of an object complement each other. The first is getting rid of surplus for the sake of preserving the equilibrium of the social system. “Elites” do get rid of the surplus human biomass. On the other hand, by excluding some people from the processes of consumption (capitalist production), they perform a symbolic action that should return them to a state of immanence with nature.

All forms of mass extermination in the 20th and 21st centuries acquire a new semantic dimension in the light of the ideas of Jean Baudrillard and Georges Bataille. There are many more parallels than differences between the Great Terror of the 1930s in the USSR, World War II, the genocide of the Jews, the coronavirus pandemic and Aztec human sacrifice. The declared purpose in all cases is to protect the interests of society from its enemies, racially inferior elements, deadly disease and the disfavor of the gods. All this is a certain external threat hanging over people and demanding urgent action from the state (in fact, from the power “elites” that govern the state), which stands up in their defense. The struggle is waged

through the search for foci (the perpetrators or those on whom blame can be laid) and their physical elimination – murder or isolation, which in turn also leads to death. Together with actions aimed at eliminating the danger, in all these cases the victims are eliminated as demographic surplus and at the same time excluded from the world of production and consumption, the world of things. The religious component and appeal to a higher power are outwardly abolished but remain essentially intact.

In the chosen perspective, the consideration of the goal-setting of sacrifice is transformed together with the goal-setting of society as a whole. Such attitudes are set by religion throughout most of history. First it is the worship of totem animals or plants, then of the elements, then of the deities embodied in these elements, and even later – of some universal principles embedded in the foundation of the world and revealed through the personified message of a prophet or an incarnate god. Such are the world religions – Buddhism, Christianity and Islam. In the Modern Era, personification and, consequently, the idea that the principle-based origin takes part in the destiny of human are gradually rejected. The principles themselves acquire a purely objective and indifferent coloring of scientific laws or political ideology. In the corresponding logic, at the corresponding historical stages from primordality to our days, sacrifice is conceptualized and carried out: once to sacred animals, then to the elements, to anthropomorphic gods – lords of the elements, to the embodied Absolute, to an impersonal law formulated in some field or system of knowledge (ideology, sociology, political science, criminology, epidemiology, etc.). At the same time, things are called by their proper names, no one even tries to conceal that sacrifice is sacrifice.

One can object and say that war has nothing to do with sacrifice because it is different. However, first of all, the rhetoric itself refutes the distinction. They say, after all, “to sacrifice oneself for the Motherland,” “to lay one’s life on the altar of the Fatherland.” Secondly, the war of modern times is not an event in which everyone can participate or not participate at will. There are, of course,

professional military for whom it is a choice. They are the ones who command on the battlefield, like priests in temples. They also win battles, military campaigns are won by their bosses, and wars are won by the bosses' bosses (presidents and kings). Further and higher are the interests and victories, which they prefer not to advertise as well as the identities of the final beneficiaries of armed international strife. The price is the lives of ordinary soldiers (and civilians, who sometimes die more than soldiers), who in most cases are not asked anything and who are prepared from birth to be lambs for slaughter and scapegoats. The phrase "duty to the Motherland" is coined to explain this. In essence, they resemble Hondas children, sold by their parents and living happily ever after until the harvest fails and they are used as intended. The state disposes of the lives of its subjects at its own discretion and can sacrifice them at will, whether for pragmatic interests or for the sake of higher justice and higher powers. Thirdly, World War II, like other conflicts of the 20th century, in addition to hostilities, was associated with phenomena that in all basic parameters, form and spirit fit the concept of sacrifice. This refers to various forms of genocide, including the Holocaust. If we consider all this from the chosen perspective, it turns out that the sacrifice that formed the basis of the civilization emerged in the 21st century was the largest in the history of humankind. The number of people killed in the name of the new order is estimated in the tens, if not hundreds, of millions.

Here is what Adolf Hitler said in a speech on September 1, 1939, which marked the beginning of World War II: "For six years now I have been working on the building up of the German defenses. Over 90 bln have in that time been spent on the building up of these defense forces. They are now the best equipped and are above all comparison with what they were in 1914. My trust in them is unshakable. When I called up these forces and when I now ask sacrifices of the German people and if necessary every sacrifice, then I have a right to do so, for I also am today absolutely ready, just as we were formerly, to make every possible sacrifice" [118].

Here is what Joseph Stalin said on May 9, 1945, after Hitler's army was defeated: "The great sacrifices we made in the name of freedom

and independence of our Motherland, the incalculable privations and sufferings experienced by our people in the course of the war, the intense work in the rear and at the front, placed on the altar of the Motherland, have not been in vain, and have been crowned by complete victory over the enemy" [119]. And here is what he said a little later on May 24 in a narrower circle in the Kremlin at a reception in honor of the commanders of the troops: "A different people could have said to the Government: "You have failed to justify our expectations. Go away. We shall install another government, which will conclude peace with Germany and assure us a quiet life." The Russian people, however, did not take this path because it trusted the correctness of the policy of its Government, and it made sacrifices to ensure the rout of Germany" [120].

The version of human-made COVID-19 pandemic is controversial. However, no one can deny the facts. The majority of people who died during that period were old, poor and sick. This selectivity of the virus is recognized by absolutely everyone. At the same time, everything is explained by supposedly natural causes. For example, Klaus Schwab says: "In the US, COVID-19 has taken a disproportionate toll on African Americans, low-income people and vulnerable populations, such as the homeless. In the state of Michigan where less than 15 % of the population is black, black residents represented around 40 % of deaths from COVID-19 complications. The fact that COVID-19 affected black communities so disproportionately is a mere reflection of existing inequalities. In America as in many other countries, African Americans are poorer, more likely to be unemployed or underemployed and victims of substandard housing and living conditions. As a result, they suffer more from pre-existing health conditions like obesity, heart disease or diabetes that make COVID-19 particularly deadly" [27].

Schwab recognizes that the beneficiaries of the pandemic have been governments and corporations that have dumped the burden of pensions and benefits, while at the same time destroying small businesses and curtailing people's freedoms. In particular, the trampling of privacy rights is cited. "Most people, fearful of the dangers posed by COVID-19, will ask: Isn't it foolish not to leverage the power

of technology to come to our rescue when we are victims of an outbreak and facing a life-or-death kind of situation? They will then be willing to give up a lot of privacy and will agree that in such circumstances public power can rightfully override individual rights. Then, when the crisis is over, some may realize that their country has suddenly been transformed into a place where they no longer wish to live. This thought process is nothing new. Over the last few years, both governments and firms have been using increasingly sophisticated technologies to monitor and sometimes manipulate citizens and employees; if we are not vigilant, warn the privacy advocates, the pandemic will mark an important watershed in the history of surveillance. The argument put forward by those who above all fear the grip of technology on personal freedom is plain and simple: in the name of public health, some elements of personal privacy will be abandoned for the benefit of containing an epidemic, just as the terrorist attacks of 9/11 triggered greater and permanent security in the name of protecting public safety. Then, without realizing it, we will fall victims of new surveillance powers that will never recede and that could be repurposed as a political means for more sinister ends" [27]. In sum, COVID-19, like any sacrifice, perpetuated and reinforced a social order in which the few wield wealth and power over all others.

Despite technological progress, declared democracy, humanism and others, modern society retains primitive prerational and irrational attitudes at its core. The necessity of sacrifice is one of the key axioms. The concept of "sacrifice" continues to be sacralized. The default assumption is that in order to achieve anything in personal or social life, in relation to the state or the planet as a whole, something must be sacrificed.

If you ask "Why does society no longer practice human sacrifice?" the answer is that it is irrational. But is society really guided by rational principles? Far from it, as many researchers agree. "For a long time, the unique quality of humans was considered to be reason. It is no coincidence that this ability was noted in the self-name of our species. However, the hubris of *Homo sapiens* turned out

to be unjustified. Studies of the last century have shown that great apes are capable of sign and instrumental activity. The IQ difference is paradoxically explained by the fact that animals are too rational. They do not do anything for nothing, including not multiplying entities. Instinct is enough for survival, so there is no need to use reason.

Man differs from the beast not by reason, but by faith. Therefore, the phenomenon of culture can be explained only through religion" [106].

If this is true, then irrationality is the defining feature of culture. There are many indirect confirmations, starting from the fact that people throughout their history have been fighting, killing and destroying what they have created with great difficulty, and ending with the position and the negligible role that the carriers of scientific and engineering rationality play in society at different times, up to the end of the first quarter of the 21st century.

The humanity of modern society can be disputed as well as its rationality, just like other possible qualities that would make sacrifice (including the human one) impossible in the modern world. If there are no such indisputable qualities, then sacrifice is possible as a mass and system-forming practice.

Human sacrifice is a very successful matrix for structuring and comprehending the processes that began at the end of the last quarter of the 20th century and in the first quarter of the 21st century, which have become quite radical. We are talking about a profound restructuring of the world order – the reform of capitalism with all its consequences, including the need to reduce the world's population. The logic of sacrifice is the only one possible for such a transition, because it allows us to achieve the desired result and at the same time justify the extermination of humanity on a global scale. Moreover, extermination can be carried out as painlessly as possible, since the need for the victim to accept his or her fate is probably the most important distinguishing feature of sacrifice as a form of killing. It is enough to set people up for self-sacrifice, and they themselves will go to the slaughter, leaving no offspring.

How does such a process take place, how is it structured, and to what result will it lead?

The Club of Rome report entitled "The Limits to Growth" [18], published in 1972, can be taken as a starting point, although the roots of the process of interest can be found even deeper in time, for example, in an essay of Thomas Malthus [14]. Be that as it may, the "global elites" faced the problem of planet's overpopulation and exceeding the limits of world population growth. The terrible specter of ecological catastrophe appeared on the horizon. In order to avoid it and propitiate nature, a human sacrifice was required, which was then planned and probably already started to be executed according to the quickest and simplest plot of three acts.

Act 1: Pandemic ("plague"). Creating tension in society while limiting the freedoms of the population through total digital control makes it possible to organize the environment for waging a local nonnuclear war in Europe. Thanks to the practices of lockdowns and the suppression of protests arising in this context, the population turns out to be passive enough meekly to accept the new restrictions and inconveniences associated with such a war. There are no mass protests either in the belligerent countries or in the states providing financial and military support to one of the parties. People during the pandemic got used to the idea that the state decides their fate for them.

Act 2: Local nonnuclear war. European economy weakens due to a significant increase in the cost of energy resources. New political and economic camps and coalitions are formed. More participants are gradually involving in the conflict. Tensions rise to an extreme point.

Act 3: Global nuclear war – achieving the required result.

Before that, decades of preparation for the ritual had been going on. Hollywood worked tirelessly, introducing into mass consciousness the idea of bleak and catastrophic future, sowing hatred in society, popularizing violence, egoism, hedonism, etc. The mass media and education worked for the same purpose, destroying the principles of humanity and progress, instead of them implanting in our

heads the need to strive for success no matter what and sowing moral relativism, in which there is neither good nor evil, but only profit or its absence.

The family as a fundamental institution has been devalued. In fact, people have been forced to perceive themselves as a kind of meaningless biomass (like mold), uncontrollably multiplying and destroying nature. Such humanity is ready to sacrifice itself in the interests of nature, glorified by eco-activists and representatives of green parties. And although each person will protest against the fatal unfolding of events for civilization by the instinct of self-preservation, having no doubts about the other. In a YouGov survey of nearly 8,000 people from eight countries (Brazil, Egypt, France, Hungary, India, Japan, Nigeria and the United States), the most common statement was that the current world population is too large. In all countries except Japan, more than 50 % of respondents felt this way. In Japan, it was 43 %. In addition, the majority is convinced that two children per family is also too many [121]. This opinion is not accidental but purposefully formed. As an illustration, here is a clipping from The Times newspaper with the article "Kids are cute but they're not really eco-friendly" [122]. The text talks about how much resources are consumed and how each new child consumes and pollutes the environment. All this leads to what is so necessary in sacrifice – the victim accepts his or her fate without complaint.

Technically, everything is also ready for the largest human sacrifice in history. Nuclear weapons were invented by engineers commissioned by the ruling "global elites" more than 70 years ago, then widely distributed and replicated by them. The fingers of the newly-appointed priests are already over the red start buttons. If the society in the 21st century as well as thousands of years ago continues to act according to the rules of ritual, the chance of human-made Armageddon is very high. The representatives of the "elites" themselves are talking about it, either calling to come to their senses or preparing the victims for a gruesome end.

"Prospects for peace keep diminishing. The chances of further escalation and bloodshed keep growing," the UN Secretary General said on February 6, 2023.



Kids are cute but they're not really eco-friendly

One less baby helps the planet more than giving up meat, car

Having children is the most destructive thing a person can do to the environment, according to a new study.

Researchers from Lund University in Sweden found having one fewer child per family can save “an average of 58.6 tonnes of CO₂-equivalent emissions per year”.

Eating meat, driving a car and travelling by aeroplane made up the list of the most polluting things people can do to the planet.

But having children was top, according to the new study, published in the journal *Environmental Research Letters*.

“A US family who chooses to have one fewer child would provide the same level of emissions reductions as 684 teenagers who choose to adopt comprehensive recycling for the rest of their lives,” it said.

GOOD FOR THE EARTH	
Activity	CO ₂ saved/year (tonnes)
Not having babies	58.6
Avoiding trans-Atlantic flights	2.8
Living car-free	2.4
Washing clothes in cold water	0.3
Upgrading light bulbs	0.1
Eating a plant-based diet	0.8

Lead author Seth Wynes told *The Local*: “We found there are four actions that could result in substantial decreases in an individual’s carbon footprint: eating a plant-based diet, avoiding air travel, living car free and having smaller families.”

“For example, living car-free saves about 2.4 tonnes of CO₂ equivalent per year, while eating a plant-based diet saves 0.8 tonnes of CO₂ equivalent a year.”

The paper, which studied analysed 39-peer reviewed journals studying the environmental policies of several major economies, found most governments focused on incremental changes which have “much smaller potential to reduce emissions”.

Although governments focused on increasing recycling schemes and using energy efficient light bulbs, these methods were between four and eight times less effective than eating a plant-based diet.

Researchers found that avoiding one trans-Atlantic flight per year can save between 0.7 and 2.8 tonnes of CO₂ equivalent per year (depending on the distance travelled, amount of luggage on board and how many passengers on the flight) whereas recycling will typically only save 0.21 tonnes of CO₂ equivalent per year. This means recycling is 3–13 times less likely to save the planet than avoiding that extra flight. Carbon emissions must fall to two tonnes of CO₂ per person by 2050 to avoid severe global warming say researcher.

Caroline Mortimer

He reminded that the so-called Doomsday Clock, which is a symbolic dial created 76 years ago by nuclear scientists, including Albert Einstein, today shows one and a half minutes to midnight, i.e., before the self-destruction of humanity. Never, not even during the Cold War, has the hand of this metaphorical clock been so close to the point of no return" [101].

Alternatives to Sacrifice: Ritual and Engineering

When it comes to evaluating a war, one way or another the question arises: should the attacked party have fought back aggressively with weapons in their hands? Often the situation is analyzed using analogies of a domestic nature. For example, they compare it to an armed intrusion into a house and causing harm or threats to family members. Then it is said that it is absolutely natural to protect one's home and loved ones. There is not and cannot be any alternative. But is this the case? Is it rational to resist an enemy who is known to be stronger than you and who does not intend to destroy you, but only wants, for example, to rob you? In a different formulation, this is the question "Trick or treat?" If we describe the situation in this way, it turns out that most people would prefer to hand over their wallet. In this case, the chance of being killed remains, but the chance of survival increases significantly. We can conclude that such a choice is rational if survival is the ultimate goal. If the highest goal is something else – preservation of "honor" or "wallet" – then handing over the wallet is not rational. Therefore, the rationality of the choice depends on the goals that guide the decision.

Human sacrifice can be considered rational if the purpose of society is to preserve and maintain the existing hierarchy or to establish a new hierarchical system as part of a social revolution, upheaval, etc. Indeed, from the point of view of ruling groups or groups claiming power, such goals may be paramount. However, from the point of view of social development, this cannot be so. The goal should be to preserve the life of the population, to improve the quality of life

and to establish justice in the distribution of produced and consumed goods. For example, the US Constitution states as a purpose "to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity" [123]. The goal outlined in the Constitution of the Russian Federation is also very specific and does not directly involve the protection of the interests of any elite group. It is "to ensure the well-being and prosperity of Russia" [124]. These goals look reasonable and, at first glance, not tied to the interests of any single group of people. Yet it is not so. It is just that the group of people is a little bigger – not the ruling class but a separate country, opposing its interests to the interests of all other countries. In the end, the goal still turns out to be to protect the interests of the class ruling the state. It is just that the real goal is hidden behind outwardly humane and right formulations.

Rationality alone cannot be a panacea against irrational attitudes. Reason and rationality are only tools. As David Hume said, "It is not contrary to reason to prefer the destruction of the whole world to the scratching of my finger. It is not contrary to reason for me to chuse my total ruin, to prevent the least uneasiness of an Indian or person wholly unknown to me. It is as little contrary to reason to prefer even my own acknowledged lesser good to my greater, and have a more ardent affection for the former than the latter" [125]. The same author rightly asserted: "We speak not strictly and philosophically when we talk of the combat of passion and of reason. Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them" [125].

Agreeing with the English thinker, we would have to conclude that society in general has never been and cannot be rational in its foundations. One way or another, in the beginning there will be a passion for power, which leads to aggression and destruction – what Friedrich Nietzsche called the Dionysian beginning of culture – "primordial chaos and terror, bacchanalian awe, the thrill of intoxication and ecstasy" [126]. Even if this is true and passion is the real basis of everything done by human and people, the activity itself can still be

rational in nature. In this perspective, sacrifice can also be understood as a rational action in the spirit of Blaise Pascal's philosophical wager⁶: if sacrifice does not work, then abandoning it adds or subtracts nothing to the status quo; if sacrifice does work, then abandoning it is a loss of gain. Why then abandon the practice and the corresponding attitude, rooted not only in the consciousness of people but also in the unconscious layer of the psyche and in the operational space, which has proved itself perfectly throughout the history of humankind? And are there any alternatives?

We can say that most local civilizations are civilizations of sacrifice, or sacrificial civilizations (from the Latin *sacrificium* – sacrifice). Sacrificiality is a fundamental attribute of any of them. However, within civilization (first of all, the New European one) something is gradually emerging that acts as an alternative to ritual, understood as the main way of effective transformation of reality. Engineering acts as such a substitute. Like sacrifice and any other ritual, engineering is rational in form. It has its own goal-setting structures and appropriate tools for achieving goals. It draws on a scientific picture of the world in the same way that ritual draws on religious concepts.

⁶ Pascal's Wager is a practical argument for belief in God formulated by Blaise Pascal, a French religious philosopher, mathematician and physicist. In "The Thoughts of Blaise Pascal" (1657–1658), he proposed the following argument to demonstrate the rationality of Christian faith:

- if God does not exist, then the atheist has little to lose by believing in him and correspondingly little to gain by not believing in him;
- if God exists, then the atheist gains eternal life by believing in him and loses infinite good by not believing.

"Let us weigh the gain and the loss in choosing heads that God is. Let us weigh the two cases: if you gain, you gain all; if you lose, you lose nothing. Wager then unhesitatingly that he is.

Now what evil will happen to you in taking this side? You will be trustworthy, honourable, humble, grateful, generous, friendly, sincere, and true. In truth you will no longer have those poisoned pleasures, glory and luxury, but you will have other pleasures. I tell you that you will gain in this life, at each step you make in this path you will see so much certainty of gain, so much nothingness in what you stake, that you will know at last that you have wagered on a certainty, an infinity, for which you have risked nothing" [127].

It is quite difficult to see the differences, looking formally. However, they are fundamental.

Ritual involves performing a certain set of actions to achieve a certain result. Engineering does the same thing. The difference is in the specificity of the sequences. In ritual, the sequence is kind of broken. Between the action and the desired result, supernatural forces come into play, and the way they work remains incomprehensible to humans. Naturally, this approach is impossible for engineering. Any technology, all mechanisms and devices, any engineering algorithm must fulfill a clear and distinct function. This is the only guarantee of engineering efficiency.

Using an analogy, we can say that engineering is like a standard syllogism like "if A, then B; if B, then C. Therefore, B is C". For example, "if it is raining, you must take an umbrella; if you take an umbrella, you won't get wet; I have taken an umbrella, therefore, I won't get wet". A ritual is an abbreviated syllogism, or enthymeme. In an enthymeme, one of the arguments is missing. In the example above, it could be the argument that an umbrella protects against rain. By removing it, we get a statement like "if A, then C" – "if it rains, you won't get wet". This is how the sequence in the ritual is presented. If you kill a ram, the hunt will be successful. The missing argument is that the god of the hunt is pleased with the sacrifices offered by people in his honor. But it is clear that such arguments are beyond the boundaries of human experience, unlike the practically verifiable ability of the same umbrella to protect against precipitation. Hence, besides the formal difference between ritual and engineering, there is a substantive difference, consisting in the practical ability to verify the effectiveness of all actions in their sequence.

Therefore, engineering at a sufficiently high level of scientific development turns out to be a more reliable, tangible and predictable tool for active transformation of reality than a ritual relying on supernatural and otherworldly forces. Guaranteed efficiency of all algorithms in the chain of actions gives the highest probability of achieving the goal. At the same time, the impossibility to check the effectiveness of the most important algorithms of the ritual does not allow to be sure of its effectiveness. As a result, the shaman's

tambourine and incense smoking cause rain with a conditional probability of 50/50 – “will be raining / will not be raining”, which has nothing to do with scientific and engineering probability, like any other guessing on the coffee grounds. Nevertheless, people continue to believe in rituals and use them.

Another difference between ritual and engineering is that the purpose of the ritual and the purpose of the subject (the priest) who performs it coincide. The priest must get a result. At least his authority and well-being depend on it. Thus, ritual personalizes the goal. Engineering, on the other hand, has a practical and impersonal goal, as it is achieved not through the expressiveness of the shaman’s dance and the depth of the trance into which he entered but through devices and mechanisms which, although created by human, are already isolated from their creator at the moment of the work. Engineering works according to the laws of physics of the real but not virtual world, for which the law is not written: this world, invented by people and not created by God and cognizable by human, will work under laws the shaman wants. This is another side of the democratic nature of engineering compared to the elitism of ritual. Nevertheless, in modern society, which claims to be democratic, ritual retains its appeal and is valued even more than engineering solutions, which have become part of everyday life and perform auxiliary functions.

The ritual’s appeal against engineering has many explanations. Ritual is an apparently simpler way deeply rooted in tradition and thus sanctified and validated by it. Ritual may promise the attainment of ultimate goals, such as immortality, world domination, infinite wealth, etc. Finally, ritual is more suitable than engineering to fulfill the function of consolidating and preserving the domination of certain social classes over others.

Unlike ritual, engineering has as its consequence and function not the preservation and strengthening of the domination of some social classes over others but, on the contrary, the reduction of inequality in society. This is for two main reasons – public comprehensibility and public accessibility. Firstly, as has been shown, engineering requires clarity and verifiability of all actions in the accepted

and utilized, clear and unambiguous sequences of those actions to achieve the goals. This signifies the transparency and public accessibility of engineering as opposed to the closed, esoteric nature of ritual. Secondly, being a clear and publicly accessible way of transforming reality, engineering and its fruits can be used by everyone without status restrictions.

Ritual was invented by the priests who ruled primitive society. They and their descendants, up to the modern “elites”, have maintained it for thousands of years of human history. They do not know and do not want another, more effective tool for working with reality. For these and other reasons, ritual has been and will be for some time to come the dominant way of effectively transforming reality. And if this reality faces crises, the most powerful rituals aimed at overcoming crises will be used. Among such rituals is human sacrifice.

Civilization of the Future: Sacrificial or Engineering?

Much of what has recently become known about European and American “elites” indirectly confirms the prevalence of certain occult beliefs and practices in their circles. Starting with the accusations of pedophilia against Michael Jackson and ending with the global network of human trafficking created by Jeffrey Epstein, including the supply of child sex slaves for billionaires, presidents and members of royal families. It is likely that the people who run the world adhere to some moral principles unique to their circle. There are probably Satanists who sacrifice babies. None of this is provable. But there is no need to prove it.

The preceding consideration shows that ritual and human sacrifice as one of its most powerful forms have been and remain an instrument for establishing and preserving the domination of some people over others, enshrined in the social order. Even the most democratic countries publicly resort to ritual in the form of elections, referendums, courts, rallies, etc. If some forms of rituals are used,

there is no reason to believe that others will not be used as well. And if at the end of the first quarter of the 21st century humanity began to experience another global metamorphosis, then, as before, we should expect that this transformation will be accompanied by global sacrifices. These have probably already begun in the form of pandemics and a major war in Europe. Probably, as the most ardent haters of everything that comes from Malthus, the Club of Rome and the Davos Forum expected, these processes will result in the death (sacrifice) of a large part of humanity.

In fact, the modern (capitalist) world order has no other way of self-preservation than to commit the most massive human sacrifice in history. The presence of more than 8 bln people on the planet jeopardizes the dominance of the "elites", as they are unable, while maintaining their power and wealth, to provide a high level of existence for such a huge human mass. If they do not, this critical mass may sweep them away. Furthermore, capitalism in the age of automation does not need so many laboring hands, and especially not so many mouths. Finally, maintaining the capitalist mode of production and distribution at this density of inhabitants may very soon make our planet unusable for anyone at all – neither for "elites" nor for other human masses. The sacrifice of, let us say, 7 bln people would solve everything. Such plans and such a possibility, as can be seen from all the preceding consideration, are legitimate from the point of view of historical experience and traditional practices, beginning with potlatch and ending with World Wars I and II. Is a different outcome possible?

Since the Earth's human civilization has only one way of activity transformation of reality, which can be somehow compared to ritual, there can be only one alternative to ritual – engineering and establishment of engineering civilization.

An engineering civilization will not make sacrifices to achieve a goal because the very purpose of engineering is practical and impersonal. Only such a goal can become universal and unite people in a new way, opening new opportunities for them.

The highest individual goal is individual happiness. The highest common goal is common happiness. Such a goal can only be

impersonal, and therefore, it is achievable only on the path of engineering without any priests, in this case, power "elites", claiming special laurels and percentages of profit.

The political programs of the engineering civilization will become absolutely transparent, since no argument in them will be overlooked and each argument can be tested practically in terms of its effectiveness. There will be no more talk about abstract freedom, dominance, justice and the like. Instead, there will be talk of new agricultural technologies, new energy, new transport, new urbanism and, finally, a fundamentally new non-rocket way of near space industrialization.

The economy of an engineered civilization will not resemble magic, with its jumble of complex interest rates, futures and the intricacies of the credit and banking system and stock markets. The economy will be based on engineering production – completely transparent and predictable.

The culture of engineering civilization, created by thousands of previous generations of nameless engineers (even if they had not graduated from universities established by the "elites"), starting from the inventor of the fire, will be oriented again to simple and understandable civilizational values: happy family, interesting job, creative work, Live Nature in its highest manifestation – the biosphere of the planet, which nurtured and raised our Earth's human civilization. These values in sacrificial civilization have been replaced by abstractions like wealth and success, because the very essence of civilizational sacrifice is not production but exchange. Sacrifice is an exchange, and it requires values that can be exchanged.

Everything is prepared for the formation of engineering civilization in the first quarter of the 21st century. Engineering is no longer inferior to ritual in any of the things in which it has been inferior for most of the time of humankind's existence as a planetary engineering society. Engineering helps to fight drought and increase crop yields many times over, allows us to travel at the speed of sound and transmit information at the speed of light, can cure diseases and prolong life, allows us to hear the voices of the long dead and peer into the past of distant galaxies. The only thing

that engineering does not do as well as ritual is not serving the enslavement and power of some over others: an airplane created by an engineer is not a slave to the pilot, and the pilot is not a slave to the airplane. But the pilot can become someone else's slave, including by means of an airplane that is someone else's property. However, engineering does not need that. It does not aim to take away and limit. It claims to be much more than that. It is ready to give everyone as much as they need.

Engineering civilization will reassemble our human world in a new way. It will create biospheric forms of settlement, safe and environmentally friendly transport systems, bioecoenergy, eco-industry, organic agriculture, capable of feeding, clothing and footwear for 10 bln people, while ensuring global safety rather than regional and country-specific ones – infrastructure, transport, energy, food, demographic, environmental, sociopolitical and a dozen other civilizational safeties.

The listed and other global problems, including limited Earth's resources, global warming and rising ocean levels, are not really determinants for the future of humankind. A much greater civilizational danger is not engineering achievements but the most terrible social "technology" generated by "elites": human sacrifice, based on pagan rituals, supernatural and otherworldly forces. All this was generated by civilization for the simple reason that our human civilization is exactly engineering ("technogenic", "technocratic", "industrial"), but unfortunately it is governed not by the engineers who created it but by pseudo-elites, newly appeared priests, for the sake of their own profit and preservation of their power. Only engineers are capable of solving the global problems of our time, not "elites" – this cancerous tumor in the civilizational organism. Even one cancer cell among trillions of healthy ones in the human body feels itself as an elite and for its own benefit starts to control healthy cells and organs until by metastasizing kills the whole organism and dies. Now our engineering civilization is penetrated by metastases from "global elites" controlling it, but it is still alive and can and should be cured. Methods of cancer treatment are known, they have been also created by engineers.

Dolphins do not have engineering and the resulting science, engineering, technology, arts, education, health care, urban environment, societies, politics and much more, because this civilization is not engineering but purely animal, albeit highly organized. However, they have no governing elites and no problems caused by them.

Engineering will allow people to relocate all production harmful to the Earth's Live Nature into space, solving human-made environmental problems once and for all, separating two antagonists in space: the biosphere and the technosphere. People will be able to discover new planets and travel to other galaxies. On Earth, our cradle of civilization, there will be no limitations on population, no shortage of products and territories, no reasons for wars and no more sacrifices will be needed – neither human nor natural.

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