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Humanitarian Ideology in Technical Developments (Based on the Works of Leonardo da Vinci and Jules Verne)

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Abstract

Currently, the philosophy of technology tries to emphasize technical thinking and contrast it with humanitarian thinking. There may be certain reasons for this, but an appeal to the history of technology and art shows that science developed in parallel with art and artistic imagination greatly contributed to the development of science and technology. Based on the experience of past and present humanity, it would seem that it is likely that the imagination is more developed among representatives of the humanities, but there is no separate humanitarian and technical thinking: creativity is characteristic of both. The idea is primary, the implementation is secondary: an idea is needed in order to implement it technically later, and such ideas are offered more often by representatives of the humanitarian field of intellectual progress. Combining humanitarian and technical thinking is the way to further humanity development, and that's why it's so relevant. Using the example of the legacy of outstanding thinkers of the past – Leonardo da Vinci and Jules Verne – it is shown that most of the achievements of today's technology were predetermined by method of artistic imagination: hyperbolization, comparison, transfer by function, etc., which is the novelty and feature of the article.

Keywords: *creativity, humanitarian thinking, Jules Verne, Leonardo da Vinci, technical thinking, Technology*

PEER REVIEW

1. Introduction

The combination of humanitarian and technical thinking has always been the subject of philosophical discussing since history shows that the development of technical sciences was largely predetermined by the ideas of representatives of artistic literature and applied art. In our opinion, every mindset is humanitarian in its infancy. It is always reasonable. Rational thinking, according to Hegel, "as such consists precisely in the fact that it contains in itself opposites as ideal moments" [Hegel, 1974, p.213]. Rational thinking, aimed at spiritual components, humanitarian thinking, aimed at technical components, technical thinking. The essence of opposites lies in the fact that in the first case, thinking works to transform spiritual principles, in the second to transform the surrounding reality. In both cases, we answer the questions "How?", "How to do?", "With what?", etc. Both humanitarian and technical thinking works along the chain of "idea - presentation - implementation methods - end result". Naturally, the final results and methods of implementation differ in it. If a humanitarian can imagine a flying person with the help of flapping wings, like a bird, and describe it without taking into account the question "How?", then technical thinking requires first of all an answer to this question. The transition from humanitarian to technical thinking is a transition from representation to a mechanism of implementation. The connection between them is obvious, because before thinking about how to realize a bird-man, you need to figure out that a person can fly like a bird. "Using the general scientific principles of analysis, synthesis, and abstraction, but applied more utilitarianly, in greater correlation with the results of direct complexly organized human practice, we obtain technical thinking" [Chashchin 2012: 53].

We must not forget that ideology has the strongest effect on a person. A. Einstein's famous phrase: "Dostoevsky gives me a lot. Very much. More than Karl Gauss." It's hard to imagine the damage Ronald Reagan's Star Wars myth caused to the Soviet economy. Our USSR was destroyed not by atomic bombs, but by "humanitarian techniques" perfectly developed in the United States by Z. Brzezinski. Today, a variety of ways are possible to combine the efforts of humanities and techies, and the introduction of humanitarian ideology into technical developments seems to be one of the most promising. "It should be borne in mind that the strict demarcation between the natural sciences and the spiritual sciences had its foundations for science in the 19th century, but it is largely losing its force in relation to science in the last third of the 20th century." [Stepin, 1995, p. 8]. To determine the facets of combining two different types of thinking, it is natural to turn to history.

2. As the Ideas Say

One of the most famous humanitarians in technology was Leonardo da Vinci (1452-1519). The world has repeatedly stressed that before achieving the technical results of the twentieth century, the great artist lacked ... a motor. And there were a lot of technical projects [Jivilegov, 1974; Tsolner, 2006; www.codex-atlanticus.it][1].

Let's start with a parachute, which was designed to land from burning houses. It was a pyramid with a height and width in seven meters. The structure was made of fabric and wooden fixtures, and it was quite heavy. Contemporaries assumed that when landing, it could crush a person. But we're interested in something else: how Leonardo went about creating his parachute, which remained only on paper. He used the pyramidal shape of a child's toy, dramatically increasing its size, which in art is called hyperbolization. This technique was especially clearly implemented by him when creating a crossbow, which differed from modern crossbows in gigantic size.

[1]This site is bilingual and provides a panoramic overview of the Atlantic Codex and is available online. The website allows us to analyze paintings and drawings by Leonardo da Vinci in detail.

An interesting comparison is its propeller, which, in theory, with the efforts of four passengers, was supposed to enable the device to take off. It was a metal spiral stretched by a canvas. It completely repeated the wheel for supplying water to a certain height, which was used in Ancient Egypt and Mesopotamia. But it's not the form that's important here, but the thinking: the genius found a way to solve a practical problem by comparing methods contrasting the functions, which he did in artistic creation[2]. "Research in normal science depends on the ability to group objects and situations into similar systems drawn from samples" [Kuhn, 2003, p. 257]. This is similar to metonymy, which is characterized as transferring the name of one object to another based on an "external or internal connection between them" [Rosenthal, 1976, p.107], i.e. it is a kind of semantic derivation based on the adjacency of the denotations of the producing and derived words. Adjacency a priori presupposes functional parallelism, i.e. the similar functioning of different mechanisms. In this regard, the water wheel and the propeller rotate for a *similar purpose*: to create a lifting force. If the waterwheel lifted the water, then the propeller had to lower the air, which would create a lifting force. Here, in the idea, we have a combination of the myth of flying carpets, airplanes, etc. with a real, functionally similar mechanism. The development of technology initially received an artistic embodiment. M.A. Gukovsky's opinion on Leonardo's attempt to solve a mathematical problem is characteristic in this regard: "In all likelihood ... we are dealing with a half-draft recording, which shows the process of Leonardo's work on solving the problem, rather than a ready-made solution." [Gukovski, 1947, p.716]. Leonardo decided within the limits of what was possible in his time, and he also drew incorrect conclusions, as shown by M.A. Gukovsky in this fragment: imaginative thinking was drawn to accuracy, but he did not have a forerunner on whom he could rely in his research and calculations.

Leonardo da Vinci proposed several bridge designs. One bridge was rotating, collapsible. It could be thrown over water and other obstacles during military operations. The essence of the matter was balancing the structure on both sides. Leonardo did this with the help of a counterweight, i.e. he balanced the contrast, which artists use to metaphorize the image.

Leonardo's road bridges, which were built of wood, also solved a practical problem. To ensure the increased bearing force of the beams, Leonardo used jagged cutouts, i.e. strengthened the connections of structural elements with the help of shapes that were used in fine art, in particular in sculpture and architecture. In other words, he used the same comparison method, and the main thing in these decisions is the idea. Collapsible bridges in a slightly different form are now actively used in military affairs to quickly overcome obstacles with uncomfortable terrain (not only water ones), and lightweight wooden bridges are being built for pedestrians according to the recommendations of an Italian genius. The technique of their construction is quite rightly called art, which indicates that art and technology are not, in fact, very far from each other activities. "Both the creativity of an engineer and the routine activity of a technician should be attributed to art as an activity" [Ostanin, 2023, p.108][3]. Another thing is that Leonardo was unstoppable in his creative ideas: "Let us recall his explanatory note to the design of the vestibule of the Milan Cathedral with its requirement for the architect to find out "what is the nature of weight, and what is the tendency of weight, and how weights should be intertwined, connected, and what actions give birth." [Gukovski, 1947, p. 721]. V. P. Zubov is right: "the tragedy of Leonardo's work is the discrepancy between his grandiose plans and real possibilities" [Zubov, 1962, p. 27].

There are several other famous inventions of Leonardo da Vinci, which represent the convergence of humanitarian and technical thinking. These are assault chariots equipped with scythes, helicopter-type aircraft, mechanisms for lifting water, a tank, a robot, etc., which were not implemented due to the lack of a motor by the author. Naturally, he could not imagine the twentieth century and sufficiently actualize the cultural meaning of technology.

Leonardo's inventions, which were not related to the need for a motor, were subsequently implemented in one way or another. In particular, a suit for scuba diving. The goal, of course, was far from peaceful. A swimmer in a da Vinci costume had to get close to an enemy ship and hit it. The main thing for us is how he could stay underwater for a long time. Bamboo tubes were used to support breathing, right up to the invention of scuba diving, which is not very different from Leonardo's idea, except for the use of scientific and technological achievements that did not exist under the Italian genius. In the myth of the sea kingdom, the characters were no different from land people. A transfer in function was carried out, which, as noted, is a characteristic feature of Leonardo's thinking. "Dan Brown's book The Da Vinci Code describes that a certain code is hidden in the works of the great master, which leads researchers to Christian shrines. In reality, there are enough secrets related to paintings, but they do not concern ciphers. Take, for example, the famous "Mona Lisa". Her main secret is her changing smile" [History, 2006, p.56]. But the "changing smile" is an artistic device. Another question is how the master achieved it. If we rely only on artistic fantasy, then it can be argued that Leonardo presented the fact in motion, violating the template vision of the world, as, for example, in poetry they represent the movement of motionless bodies: *the approach of a mountain; the sky is more likely to descend to earth or the Danube will flow to the source than I will give up Ismail; stars scattered across the sky, etc.*

The second most famous technician in the art world was Jules Verne (1828-1905) [Verne, 1954-1957]. He was guided by a completely humanitarian idea to make people's lives easier and expand and deepen human knowledge about the world. He saw the submarine (Nautilus by Robert Fulton) for the first time at the exhibition. Napoleon did not like it, because, in his opinion, its use would lead to great loss of life ("dishonorable weapon"). The idea was developed by Verne in science fiction by the method of hyperbolization. If a small submarine was ineffective, then a large one could become effective, and not for military use, but for saving humanity. It was necessary to strengthen the technical data and give new functions in accordance with the set goal so that a person could exist on it: Captain Nemo need to escape from human hell. This is not only a political metaphor addressed to former and modern humanity: the writer saw in technology a path to the salvation of mankind, a path that he did not see in the humanistic spirituality of that time. The technical characteristics of the Nautilus may still seem fantastic today (92 km per hour underwater; only by the middle of the twentieth century submarines reached the size of the Nautilus!), but they will also become a reality like today's submarines, which unlike Verne's idea bring underwater death to sailors.

[2]Cf. in L.M. Batkin, "Leonardo's drawings juxtapose female hair and the movements of water, and the undulation does not distract from both, does not lead distant objects to generalization and at the same time does not stop at the comparison, but, leaving curls with curls, and water jets with water jets, indicates the method of transformation of one special something other special" [Batkin, 1990, p. 277].

[3]Cf. the opposite point of view: "two different types of people are really being formed, with different visions, understanding of everything, and lifestyle. For an engineer, a humanitarian often looks and behaves like a Martian (because, living in the world of a technical civilization, he does not want to recognize this world), for a humanitarian, a technically oriented person is no less strange (a technical person and a technical world resemble a rational device, an intimidating or, conversely, a convenient machine)." [Philosophy of Technics, 1997, p.128].

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When Verne described the remote control of his submarine a hundred years before its implementation in the twentieth century, it was foresight as a scientific imagery combining artistic logic and inductive thinking. Perhaps at one time such management was considered as an artistic allegory (or even a "fantastic grotesque"), but even if the author himself considered his idea as a "combination of incompatibilities" (distance and control!), he was completely within the framework of artistic thinking, in the synthesis of fantasy and technology, within the framework of structural system modeling. "The secret of Jules Verne is that technology and man are one indivisible whole. At the center of his narrative is not a soulless machine, but an effective scientific idea, the soul of which is a human being, The Genius of the Sea" [Andreev, 1956, p.145].

Simon Lake, John Philip Holland, and others built the world's first submarines after reading the novel by Jules Verne: an artistic vision received a technical embodiment during the life of the great science fiction writer [Olivier, 1988, p. 45-194].

During the era of Verne's life, his ideas about space flights, presented in the novels "Hector Servadac", "From Cannon to the Moon" and "Around the Moon", were considered the most unrealistic. In them, he applied the same artistic method of hyperbolization: from the myth of the magic carpet to the myth of the spaceship to the Moon and beyond. Humanity has developed a consciousness about the spaceport, about the metal from which a spaceship can be made. This is the use of an artistic metaphor as a principle of cognition and thinking: if you can fly over the earth, then you can fly over the world. This is the principle of "realistic fantasy", originally aimed at technical implementation. Philosophers can interpret a fact as "subjective idealism." ... There is nothing objective, that is, collected once and for all. Everything in the world can be disassembled, and thus turned into a material for assembling something else. The engineer's free will finds philosophical expression in the concept of universal "doability" (Machenschaft)..." [Pertsev, 2019, p. 32]. In fact, this is not subjective idealism, but a real materialistic dialectic, the essence of which consists not only in "assembling and disassembling", but in the universal "doability" of human fantasy in the direction of set goals, a fantasy that historically originated in the artistic word (folklore) and in the artistic representation (drawings on cave walls).

The reader of these novels sees the "forerunner" of space flights in the works "Robur the Conqueror" and "Lord of the World", which the heros are armed with combat aircraft and helicopters, without which it is difficult to imagine a modern army. These fantastic monsters, described very carefully by the writer, are embodied in a different model, but it is possible that the technologies of the future will reach the degree of development that will make it possible to build just such machines. Artistic thinking does not require evidence and grounds: it strives to see the future and transmits its vision to technology for implementation. According to the apt remark of Y.P. Brandis, "based on the search for scientific thought, he (Jules Verne. – Ed.) portrayed the desired as already realized... Hence the frequent coincidences of a fantasy fiction writer's dream with its subsequent realization. The fiction of "Extraordinary Journeys" is based on scientific plausibility and often on scientific foresight" [Brandis, 1976, p. 10]. But this is also hyperbolization.

"Paris au XXe siècle" by Jules Verne (written in the middle of the 19th century) [Verne, 1995] takes us to the capital of France in the twentieth century, where there is television, telecommunication (Internet). Later, he would write the story "In 2889" (1889), where not only the Internet would appear. From his point of view, this can be called a visual vision of the space of the future, scientific imagery, a set of symbols, but it is generally a typification of the future, which could not be seen without using a synthesis of artistic thinking, artistic and technical imagery, divorced from both man and his world. Unfortunately, J. Verne predicted the electric chair as a way of carrying out the death penalty. In the context under consideration, in line with the writer's humanistic prescriptions, such a chair does not look like the nonsense of civilization, but its negative side, facing away from man into the hell of hell. According to some modern concepts, which, by the way, are not without foundation, science in this regard should be interpreted "as a force closely linked to the establishment, immensely far from the vital interests of ordinary people and, moreover, even hostile to them, contributing not at all to democratic, but, on the contrary, to totalitarian tendencies, dehumanizing the world, generating and intensifying the alienation and enslavement of man" [Yudin, 2005, p. 136]. This idea of human madness was continued in the novel "Five Hundred Million Begums," in which the main character, Professor Schultz, a nationalist by "religion," creates a long-range cannon capable of hitting targets at a great distance. In modern conditions, where the evil spirit of the Third World War is in the air and deadly missiles from long-range cannons can reach a person even at a depth of 40-50 concrete meters, it is difficult to determine the artistic principle of the author: what is it: grotesque? Hyperbolization? Is it a typification of the madness of the future or the embodiment of universal hell?

In the novel "The Flag of the Motherland", the writer describes the fulgulator of the main character of Tom Rock's work. His fulgulator is a carrier of nuclear ammunition, since it destroys everything within a certain range. All developments by J. Verna proceeds from artistic logic: allegories, comparisons, metonymies, metaphors + the material base of the epoch. "The method is not a simple set of techniques and rules developed independently of material reality and practice. The method is also not a way to solve problems a priori. The origins of the method must be sought in real, material reality" [Karnilov, 2014, p. 154]. The quotation refers only to technical methods, but there can be little doubt that artistic images or figurative expressions also have a material basis (prototypes). The unique fantasies of outstanding thinkers of the past and present, including Leonardo da Vinci or Jules Verne, are based on creative imagination with material foundations.

It is difficult to list all the predictions and inventions of Jules Verne, but the creation of a moving sidewalk seems to be the most unattainable. It's not an "invention of an unprepared mind." "When I talk about a scientific phenomenon, I first examine all the sources available to me and draw conclusions based on a variety of facts. As for the accuracy of the descriptions, in this regard I am indebted to all possible extracts from books, newspapers, magazines, various abstracts and reports that I have prepared for future reference and are gradually replenishing," wrote the great science fiction writer [ru.wikiquote.org›wiki]. As we can see, his scientific vision of the future is not only the fruit of artistic fantasy. Y.P. Brandis explains the method of Jules Verne in the words of his hero, the forward lookinger: "The heroes will penetrate into the deepest depths and discover an unknown world there.... Why not use the hypothesis of intraplanetary voids for this! After all, scientists once assumed that the globe was a porous or hollow body, with relict flora and fauna, and even with its own small sun warming the underworld..." [Brandis, 1976, p. 11]. Combining the assumptions of scientists + creative imagination = Jules Verne.

3. Conclusions

Thus, the basis of the "technical" creativity of the authors in question, naturally, is a kind of thinking. As shown in the work, the authors used an artistic approach to creating the technology of the future. However, another interpretation is possible, much

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more realistic: both Leonardo da Vinci and Jules Verne possessed both artistic and technical thinking, which allowed them to present what was meaningful in the artistic consciousness as a real object with certain physical properties. Philosophically, it can be stated that these authors had encyclopedic knowledge and the ability to "encyclopedic" transformations, i.e. to transform using the entire arsenal of creative means. But the main thing is that the ways of representing the technology of the future of famous thinkers are relevant today and can serve as a guide in creating new technical wonders.

At the same time, based on the experience of Leonardo and Jules Verne, it seems to us that humanitarian and technical thinking should not be particularly opposed, because in both cases a culture is created that is a combination of spiritual and material. In both cases, an image is first created, an idea that is embodied in the spiritual or material. Both types of thinking are creative. In our opinion, Leonardo had more humanitarian thinking, which he transferred to technical developments. He had no one to get a technical education from. Leonardo is a synthesis of the imaginary and the real of his time. Jules Verne combines humanitarian thinking with technical thinking: he specifically studied the basics of technology. As indicated, Leonardo did not have a motor, so he was faced with the task of realizing movement with the help of a human. He also had no special knowledge of theoretical mechanics: they almost did not exist in the Da Vinci era. "Leonardo had neither a systematic approach nor sufficient mathematical skills to complete the development of his ideas or to convince them of their truth" [Bernal, 1956, p. 216]. Jules Verne did not have a task on how to implement the movement. In his era, the engine was already running. In his era, theoretical mechanics was sufficiently developed to make the appropriate calculations. There is a distance of almost 400 years between the considered geniuses of their eras, between their science and technology, so it becomes clear why da Vinci's developments have remained more on paper, while Verne's predictions come true one after another.

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Not applicable for this article.

Trial registration

Not applicable.

EARLY VIEW