

Marcin Pomarański

<https://orcid.org/0000-0001-5008-2612>

Maria Curie-Skłodowska University in Lublin

Konstantin Tsiolkovsky's heroic techno-utopia

Zarys treści: W niniejszej pracy Autor podejmuje próbę odpowiedzi na pytanie o charakter idealnego społeczeństwa zaprezentowanego przez Konstantego Ciołkowskiego w powieści utopijnej „Poza Ziemią”. Uchwycenie specyfiki tej wizji nastąpi poprzez analizę jej związków z charakterystycznym dla Ciołkowskiego monizmem kosmofilozoficznym, jak również z jego naturalistycznym podejściem do badań naukowych. W tym celu zostaną poddane analizie utopijne elementy tej wizji, ze szczególnym naciskiem położonym na warstwę naukowo-technologiczną. Pozwoli to spojrzeć na jego koncepcję w kategoriach utopii technologicznej, a zarazem utopii heroicznej.

Content outline: In this paper, the author attempts to answer the question about the nature of the ideal society presented by Konstantin Tsiolkovsky in his utopian novel *Beyond the Planet Earth*. The specificity of this vision will be discussed by analysing its connections with Tsiolkovsky's hallmark cosmophilosophical monism, as well as with his naturalistic approach to scientific research. For this purpose, the utopian elements of the vision will be analysed with particular emphasis on the scientific and technological layer. This will allow us to treat the concept as both a technological and a heroic utopia.

Słowa kluczowe: Konstanty Ciołkowski, utopia technologiczna, utopia heroiczna, kosmizm, społeczność utopijna w przestrzeni kosmicznej

Keywords: Konstantin Tsiolkovsky, technological utopia, heroic utopia, cosmism, utopian community in outer space

Introduction

*Nullum magnum ingenium sine mixtura dementiae fuit.*¹ This phrase, appearing towards the end of Seneca the Younger's treatise *De Tranquillitate Animi*, although put into the mouth of Aristotle, could well have been the life credo of Konstantin

¹ “No great genius has ever been without a touch of insanity.” Seneca, *Minor Dialogues, together with the Dialogue on Clemency*, transl. A. Stewart, London, 1889, p. 287.

Tsiolkovsky, who was born almost two millennia later (1857–1935). The fortunes of this man, who, as he himself said, “combined Russian, Polish, Tatar and most probably Ukrainian blood,”² bear unlike any other proof to his genius and scientific vision-making which, in an almost poetic rapture, have been focused on discovering the mysteries of the world without paying attention to the surroundings and a general lack of understanding in society. We will probably never understand how this self-made man, born in a “distant Russian backwater, the Ryazan guberniya” and deaf since the age of eight, became one of the most eminent scientists of his age, ultimately considered the father of astronautics who came up with the idea of rocket propulsion (1890) and the rocket equation (1903), built an all-metal dirigible (1887) and Russia’s first wind tunnel (1897). His accurate predictions of space flight and circling the Earth orbit were confirmed fifty years later by Yuri Gagarin, who upon returning from his historic mission said: “It is a sheer wonder to me how accurately did our eminent scientist foresee everything that happened to me and that I was able to experience! His numerous hypotheses have been proven absolutely correct. My yesterday’s flight was a palpable proof of that.”³

It appears extremely peculiar that, with the whole of Tsiolkovsky’s oeuvre spanning over two hundred works on physics, astronautics and philosophy, he also wrote one work in the vein of a science-fiction novel.⁴ In *Beyond the Planet Earth* (“Вне Земли”), published in 1920,⁵ he offered an ideal vision of humanity which one hundred years from the present is living in peace and universal harmony in space. This vision of a perfect community living aboard a string of space stations located 34,000 kilometres above Earth and dubbed “hot-house homes,” while mimicking the writings of Jules Verne and Herbert George Wells, is probably the first utopia set in space.⁶ For Tsiolkovsky, publishing the novel somehow

² K. Nikiforow, “Konstanty Ciołkowski: Per aspera ad astra,” *Miesięcznik Uniwersytetu Śląskiego w Katowicach*, 7 (2001), <https://gazeta.us.edu.pl/node/208771> (accessed: 13 November 2020).

³ Ibid.

⁴ Quoted from the cover of the Polish translation of “Вне Земли.” Cf. K. Ciołkowski, *Poza Ziemią*, transl. A. Bień, Warszawa, 1979. It should be noted, however, that the quality assessment of Tsiolkovsky’s works and their classification into a specific genre is not straightforward, especially when it comes to separating his philosophical and science-fiction writings. In his 1979 article “The Science Fiction of Konstantin Tsiolkovsky,” Adam Starchild enumerates about a dozen publications that on the face appear to be science-fiction. Cf. P. Klafkowski, “Citizen of the universe. Konstantin Tsiolkovsky’s cosmic philosophy and science fiction,” *Studia Rossica Gedanensia* 4, 2017, pp. 344–345. With respect to Tsiolkovsky’s works cf. also: A. Trepka, *Wizjoner kosmosu*, Katowice, 1974 and *Konstantin Ėdvardovič Ciolkovskij. Selected works*, ed. V.N. Sokol’skij, A.A. Blagonravov, Moscow, 1968.

⁵ “Вне Земли” was published for the first time in book form in 1920. It had been, however, serialised in newspapers already in 1918, and the gist of the novel had been written as far back as in 1886. Cf. Klafkowski, op. cit., p. 344.

⁶ It is impossible to determine whether this was really the case because different dates of writing *Beyond the Planet Earth* are suggested. It should be noted that 1905 saw the publication of H.G. Wells’ *A Modern Utopia*, and 1908 of Alexander Bogdanov’s *Красная звезда (Red Star)*; in

bridged the gap between his physics and astronautics treatises and his philosophical output. His utopian vision is, on one hand, an opportunity to talk about scientific discoveries that allow space exploration and are offered in a more accessible, popular form. But Tsiolkovsky also used the novel as a vehicle to manifest his philosophical beliefs, according to which the space-faring utopian community is the pinnacle of scientific and moral evolution of humankind.

The purpose of this article is to answer the question about the nature of the ideal society put forward by Tsiolkovsky in *Beyond the Planet Earth*. An attempt to capture the specific character of this vision will be made not only through recapitulating its key features, but also by analysing their connections with the author's hallmark cosmophilosophical monism and his methodologically naturalistic approach to scientific research. For this purpose, the utopian traits of Tsiolkovsky's vision will be highlighted and analysed, with particular emphasis on the scientific and technological dimensions of the idea. The article will not only allow to examine Tsiolkovsky's concept as a technological utopia, but also determine the degree to which his vision exceeds the bounds of classical utopia, becoming a heroic one.

Before considering the above, it is first necessary to answer the question about the manner of understanding and conceptual scope of utopia and technological utopia. The diversity of political, historical, sociological, and literary approaches to the utopia trope has already been discussed by numerous authors worldwide. Jerzy Szacki, for example, has assiduously collected a series of examples, classifying the various utopias as: 1) fancies; 2) ideals; 3) experiments; 4) alternatives.⁷ With these distinctions in mind, in this article I intend to focus on the last category, which defines utopia as "a certain common attitude towards the world that sharply juxtaposes an ideal state with reality."⁸ This approach fits the definition of Bronisław Baczko, who saw utopia as "a holistic vision of a social community organised around core values that transcend existing reality and are sharply opposed to it; a vision resulting from the awareness of a wide gap between ideals and duties and the actual state of affairs."⁹ Techno-utopia, or technological uto-

both cases, the utopian communities are extra-terrestrial. Wells set his story on a distant planet "beyond Sirius," while Bogdanov opted for Mars. Cf. H.G. Wells, *A Modern Utopia*, Auckland, 2009, and also A. Богданов, *Красная звезда. Инженер Мэнни. Праздник бессмертия*, Ногинск, 2015.

⁷ J. Szacki, *Spotkania z utopią*, Warszawa, 2000, pp. 16–37.

⁸ Following Chad Walsh, Szacki distinguishes the following nine assumptions as typical for an utopian attitude: 1) man is basically good; 2) man is a flexible being and changes as the circumstances change; 3) there is no insurmountable antagonism between happiness of an individual and happiness of society; 4) man is a sapient being and is able to develop its sapience; 5) the future holds a limited number of possibilities which are entirely foreseeable; 6) we must strive to ensure happiness on Earth; 7) people can never become tired of their happiness; 8) it is possible to find just rulers or teach selected people how to rule justly; 9) utopias do not prejudice human freedom because they encompass 'true freedom.' Cf. *Ibid.*, pp. 47–49.

⁹ H. Cyrzan, *O potrzebie utopii. Z dziejów utopii stosowanej w XX wieku*, Toruń, 2004, p. 7.

pia, will thus be understood as an utopia subgenre conspicuously dominated by a range of interests that consists of “the manner of thinking and acting that praises technology as a means of constructing a utopian reality.”¹⁰

Towards a techno-heroic utopia

Tsiolkovsky’s vision, although in some aspects a breakthrough, is not the first techno-utopia ever devised. The interest in science and technology that forms its peculiar feature has always been typical for utopian thinkers. To some extent, it was already present in the vision of Thomas More, whose protagonists claimed that the inhabitants of the island of Utopia had discovered some unspecified “warlike machines.”¹¹ It started taking a much more definite shape in Francis Bacon’s unfinished novel *The New Atlantis* (1623), which is set in the country of Bensalem. The scientific achievements of the inhabitants of Bensalem include, among others, harnessing the power of water, devising a weather forecast system, discovering clocks, travelling under the sea, flying, treating diseases and the art of prolonging human life.¹² Scientific and technological elements also feature in the seventeenth-century utopian visions of Tommaso Campanella or Johann Valentin Andreae.¹³ Unlike Tsiolkovsky’s, however, these visions are, as Frank Manuel would have put it, “utopias of calm felicity,” which treat science in a static manner and refuse to progress technologically. Any scientific discoveries and improvements found on their pages are merely meant to make life easier, contributing to the comfortable and felicitous existence of the utopia’s inhabitants.¹⁴ Accordingly, scientific and technological progress is not an objective of utopian societies; while it contributes greatly to their perfection, it is only a means to an end, a method of exemplifying the ideal nature of these communities.

The dissonant approach to technological utopia apparent in the vision of Tsiolkovsky and the ideas of the sixteenth- and seventeenth-century representatives of the genre is nothing out of the ordinary. During the last four centuries techno-utopias went through the same stages of evolution as other works of the genre. Their authors (and devotees) ceased to treat utopias as mere fancies or literary ideals and began to see them as plausible social experiments or alternative political ideas. Of fundamental importance for changing this perspective were not

¹⁰ H.P. Segal, *Technological Utopianism in American Culture*, Syracuse, 2005, p. 10.

¹¹ And also that they track the movements of planets using various instruments and use artificial incubators to hatch eggs. Cf. *Ibid.*, p. 57.

¹² *Ibid.*, p. 58.

¹³ I mean here, of course, *The City of the Sun* (Italian: *La città del Sole*), published in 1602, and *Christianopolis*, published in 1619. Cf. T. Campanella, *The City of the Sun: A Poetical Dialogue*, transl. with introduction and notes by D.J. Donno, Berkeley, 1981, and also J.V. Andreae, *Christianopolis*, transl. E. Thompson, Berlin, 1999.

¹⁴ Segal, *op. cit.*, p. 59.

only the rationalism of the Enlightenment and the European industrial revolution, but also the growing standing of the United States of America, which during the nineteenth century became the hotbed of new technologies, daring ideas and the most revolutionary undertakings. It is no coincidence that it was in the erstwhile US that the boldest attempts at realising utopian projects were made, such as Robert Owen's New Harmony (1825, Indiana), Étienne Cabet's Icaria (1848, Illinois), or a series of communities inspired by the ideas of Charles Fourier, including Utopia (1844, Ohio), La Réunion (1855, Texas), or North American Phalanx (1843, New Jersey).¹⁵

In the early twentieth century, the multidimensional nature of utopias, and consequently technological utopias, was already widely recognised. Literary utopias, written mostly as a form of commentary on contemporary social and political concepts, were paralleled by practical visions of those who wished to transform reality using science and technology. The former included the English writer Herbert George Wells and his novel *Men Like Gods* (1923), or the German satirist Alexander Moszkowski with his *Die Inseln der Weisheit* (1922). Among the latter, in turn, there were such figures as the American inventor and businessman King Camp Gillette or designer and architect Buckminster Fuller.¹⁶

Already in 1922, this multidimensionality took on a more analytic character thanks to Lewis Mumford, who distinguished various types of utopias based on how they tried to satisfy the spiritual needs of man. Mumford concluded that all historical utopias can be classified as either utopias of escape or utopias of reconstruction. The first is a form of retirement from daunting reality into a "careless dream" whose perfect form provides contentment and happiness. Due to its function, the dream may take a sophisticated literary or artistic form, for example a work that moves the masses, or, more privately, an individual dream or personal desire. Mumford's other category is focused not on man's interior but his surroundings. In this case, the utopian fantasy is accompanied by volitional component that desires not only to make the dream a reality but also plans specific actions to achieve this. In the words of the author, they may encompass "a new set of habits, a fresh scale of values, a different net of relationships and institutions, and possibly [...] an alteration of the physical and mental characteristics of the chosen persons, through education, biological selection, and so forth."¹⁷

Mumford's typology was often the point of departure for subsequent research in utopian realities. One of the most creative and extensive expansions of these categories was provided by Jerzy Szacki. His proposal distinguished escapist and heroic utopias, related respectively to utopia of escape and utopia of reconstruction.

¹⁵ D.E. Pitzer, "America's Communal Utopias Founded by 1965", in: *America's Communal Utopias*, ed. D.E. Pitzer, Chapel Hill-London, 1997, pp. 449-495.

¹⁶ The birth and death dates of these technological utopianists are as follows: H.G. Wells (1866-1946), A. Moszkowski (1851-1934), K.C. Gillette (1855-1932), B. Fuller (1895-1983).

¹⁷ L. Mumford, *The Story of Utopias*, New York, 2011, pp. 17-18.

Among escapist utopias, Szacki counted “all those dreams about a better world that do not trigger an imperative to struggle for that world. While they may denounce contemporaneity with the greatest pathos and severity, they do not oppose it but rather withdraw into dreams.”¹⁸ On the other hand, a heroic utopia for Szacki means “a dream combined with an imperative to act,” based on the conviction that even ineffective means to achieve an ideal are entirely different from “an objective without any means.”¹⁹

Unlike the previous type, which was associated only with literary and intellectual pastimes, heroic utopias are “deadly serious,” because they provide inspirations for social groups and political movements. The gist of these utopias is not the conceived social ideal in itself, but the inherent breakthrough and revolutionary potential which, once it falls on fertile ground, may transform the existing social and political order or seek to replace it with another one. The utopian visions that guided the twentieth-century totalitarian systems are the most poignant example. However, not all heroic utopias must necessarily produce such tragic results. The traits of the presented visions determine their applicability, and thus the scope of societal support, bounds of activities, and the choice of methods.²⁰

Utopian themes in the works of Konstantin Tsiolkovsky

For the author of *Beyond the Planet Earth*, utopian happiness appears perfectly achievable, a low hanging fruit. Very early in his story, he unfolds a vision of globalised humanity of the year 2017 that has a “world” language and “common laws which had brought people of very different natures and temperaments close to one another.”²¹ Earth’s inhabitants live in plenty and in almost perfect harmony. Feeling no need to wage war, or even raise armies, they focus on scientific and economic development, entrusting political power to a world-wide congress “consisting of the elected representatives of every state in the world.”²² The early twenty-first-cen-

¹⁸ Szacki, op. cit., pp. 56, 58-59. The author also distinguished certain categories of “better worlds,” based on where they are located. He enumerated utopias of place, lands in which men lead happy lives; utopias of time, showing the “happy past”; and utopias of eternal order, in which the ideal has been placed beyond the earthly sphere of existence.

¹⁹ Ibid., p. 62.

²⁰ In addition, not all utopian visions of this kind are meant to be achieved at a national or global scale. Based on the scope in which an utopian undertaking is achieved, Szacki distinguished two subcategories: utopias of brotherhood or utopias of politics. In the former case, the vision is realised to a limited extent by a group of people who “make an island in society or otherwise oppose society’s macrocosm by an utopian, ideal microcosm inhabited by the chosen ones.” Such groups “might devolve into sects or germinate into a political movement.” In utopias of politics, the objective of the utopianists is to reform the entire society using an innumerable variety of methods to achieve this objective. Cf. Ibid., pp. 144, 147.

²¹ Ciołkowski, op. cit., p. 107.

²² Ibid., p. 102.

ture Earth in Tsiolkovsky's imagination could well appear as "Cockaigne" of sorts, an Arcadian land of happiness and plenty. This is mostly due to advanced trade that provides twenty-first-century Earthlings with cheap access to fruits and vegetables from around the world, allowing them to follow a vegetarian diet and live in harmony with nature. And yet, this almost perfect global society is struggling with serious overpopulation. The desire to surmount this challenge drives a group of scientists to delve into astronautic research and consequently to launch man into space. This unprecedented scientific achievement triggers a chain reaction that results in building a yet more perfect society – in space.

Structurally and substantively, Tsiolkovsky's novel is in many aspects a rehash of the "classic" utopia laid down by Thomas More and his "little, true book, not less beneficial than enjoyable, about how things should be in a state and about the new island Utopia."²³ The similarities include not only the vision of an ideal place, but also a number of genre and literary correspondences, including the symbolic names of protagonists, their isolation from the rest or the world, or the journey motif as the axis around which the tale is spun. These features, although not placed there by accident, find a non-classical meaning contemporary with Tsiolkovsky, being rooted in the philosophical views of the author.

During all his life, Tsiolkovsky was committed not only to physics and astronomy, but also "a strong cosmic feeling," or "the idea of organic connection between all beings and the existence of close immanent relation between each man and the entire universe,"²⁴ which in the late 1970s and early 1980s came to be called cosmism. Tsiolkovsky was a proponent of a scientific approach to this theory, focusing on the belief that: 1) the universe, seen as an ontological whole, can ultimately be reduced to a single principle; 2) the "ultimate substance" of the universe has not been discovered yet; 3) the prime elements of the universe are hydrogen atoms. Moreover, his monist approach to reality that assumed that all beings are qualitatively the same on the most fundamental level was accompanied by faith in inevitable evolution, understood in its naturalistic aspect, as well as "emphasising the ethical dimension of man's deeds on Earth."²⁵ As emphasised by Jan Ciechanowicz, Tsiolkovsky developed a pantheistic concept of cosmic panpsychism which assumed that the cosmos is a "harmoniously evolving whole consisting of hierarchically ordered beings." For him, the universe was a single living organism consisting of "original citizens," or "primitive selves," which was his term for atomic particles. He also advanced the position that "atoms travel through space

²³ T. Morus, *Libellus aureus nec minus salutaris quam festivus de optimo Reipublicae statu de que nova insula Utopia*, 1516.

²⁴ T. Obolovitch, "Między nauką a metafizyką: filozofia rosyjskiego kosmizmu," *Semina Scientiarium*, 6 (2007), p. 45.

²⁵ *Ibid.*, pp. 45–48. Russian cosmism, in addition to its scientific variety (naturalistic cosmism) represented by Tsiolkovsky, Vladimir Vernadsky or Alexander Chizhevsky, also featured a separate religious branch whose doyens were Nikolay Lossky, Vladimir Solovoyov or Pavel Florensky.

and time, becoming successively embodied as one living creature after another, deriving the most happiness from being part of brains of highly organised, eternal sapient beings.²⁶

This philosophical perspective formed the basis of Tsiolkovsky's vision of the cosmos as a place of universal peace and drive to perfection which, due to its boundless nature, was able to overcome the limitations or imperfections of an earthly "Cockaigne." It was meant to be a space in which dreams about happy and plentiful life could finally be fulfilled. In one of his philosophical treatises, Tsiolkovsky explained that "the ethics of the cosmos, that is the ethics of self-aware beings, is that no suffering should exist at all for living beings, whether the perfect ones, or others, not yet matured, or those who have just commenced to grow."²⁷ No wonder, therefore, that space was the setting chosen by the scientist's utopian novel for its ideal community. Likewise, his own idealist beliefs are confirmed on numerous occasions by utterances of the book's protagonists who come to explore this ideal place. While reporting his first walk in space, one of the fictional scientists concludes: "You [...] know how vast and free is the space that surrounds our Earth; you know that it is filled with light; you know that it is empty. It's a sad thought that we are crowded on Earth, treasuring every sunny corner where we can raise crops and build our homes and live in peace and tranquillity. While I was wandering in the emptiness about our rocket, it was the vastness, the freedom and lightness of movement that most impressed me – that tremendous quantity of solar energy going to waste, uselessly. Who is there to stop men from building their greenhouses and their palaces here, and living in peace and plenty?"²⁸

The philosophy of cosmism not only affected the idealistic viewpoint used by Tsiolkovsky to perceive the universe, but also permeated the other aforementioned components of the utopian narrative. Of particular influence was the philosophical connection between the being of the cosmos and the earthly existence of man, as well as the conviction that the universe is self-aware and evolving. Humanity could join in the process of that evolution through rational and ethical self-improvement, whose effects could be measured by scientific discoveries and technological advances. This is reflected in the novel's framing device, the space flight of a group of scientists consisting of the Englishman Newton, the Frenchman Laplace, the

²⁶ J. Ciechanowicz, *Filozofia kosmizmu (Z historii idei). Tom Pierwszy: Konstanty Ciołkowski czyli Kosmos Szczęśliwy*, Rzeszów, 1999, pp. 31–32, 186. The monograph is the first of three volumes devoted to Russian cosmic philosophers. The other two deal with the thought of Vladimir Vernadsky and Alexander Chizhevsky. The contents of all three volumes, reedited and abbreviated, were published again in 2015. Cf. J. Ciechanowicz, *Kosmofilozofia: (trzej geniusze)*, Warszawa, 2015.

²⁷ K. Tsiolkovsky, *Научная этика*, Калуга, 1930, pp. 44–48, quoted from J. Ciechanowicz, *Filozofia kosmizmu*, p. 186.

²⁸ K. Tsiolkovsky, *Beyond the Planet Earth*, trans. by K. Syers, New York, 1960, pp. 82–83.

American Franklin, and the Russian Ivanov.²⁹ While exploring the technical possibilities of space flight, the scientists seclude themselves away in a remote scientific centre among the Himalayan peaks, build a rocket and decide to test it. Their expedition, which lasts a few years, includes exploration of space, landing on the Moon and a fly-by of Mars. Like More's Raphael Hythloday and the protagonists of other classic utopias, they set out into the unknown, unsure of what they may encounter. Their fascination and interest grows with each stage of their journey and is compounded with new scientific discoveries in the name of mankind, such as the first walk in space or finding life on the Moon.

The expedition undertaken by the protagonists is not dictated by mere curiosity. This is a methodically arranged research scheme whose outcome may be of colossal importance for the whole of humanity. Each step of theirs, both before the flight and during the expedition itself, is accurately planned and has an exploratory rationale, just as intended by Tsiolkovsky. The process also reveals a deeper metaphysical sense related to the idea of the unceasing evolution of the universe towards perfection and the corresponding ethical imperative that orders man, as the pinnacle of the biosphere, desire with its intellect to intentionally govern natural processes, bringing humanity and the universe into the age of reason, the highest mode of existence.³⁰ The conviction that scientific development contributes to moral and social progress is the source of "an almost utopian cognitive and ethical optimism"³¹ that emanates from Tsiolkovsky's protagonists.

So important a role in history is a major distinction for the scientists turned explorers, but also a huge burden. Their flight, accurately analysed and reported, triggers a rapid advance in astronautics and space technologies. As a result, at the height of several dozen thousand kilometres Earth becomes ringed with a network of "hot-house homes" made of metal and silicon, with a permanent population of 120,000 people. Taking with themselves the ideal social setting of earthly "Cockaigne" and being in boundless space, the settlers do away with the last obstacle preventing them from becoming an ideal community, a utopia par excellence. However, just like its Morean progenitor, Tsiolkovsky's space utopia was from the start set apart as separate and exclusive. In the sixteenth-century literary archetype,

²⁹ The protagonists are further supported by two other scientists who manage the expedition while staying on Earth: the Italian Galileo and the German Helmholtz. The method of naming the protagonists is obvious and serves as a homage to the most eminent physicians and astronomers of the past: Galileo (1564–1642), Isaac Newton (1642–1727), Benjamin Franklin (1706–1790), Pierre de Laplace (1749–1827), Hermann von Helmholtz (1821–1894). On the other hand Ivanov, the Russian, appears to be a stand-in for Tsiolkovsky himself. Cf. for example M. Holquist, "Konstantin Tsiolkovsky: Science Fiction and Philosophy in the History of Soviet Space Exploration," in: *Intersections Fantasy and Science Fiction*, ed. G.E. Slusser, E.S. Rabkin, Carbondale-Edwardsville, 1987, p. 83.

³⁰ Ciechanowicz, op. cit., pp. 25–26.

³¹ Obolevitch, op. cit., p. 50. Unlike elsewhere in this work, the term "utopian" found in the quote above has been used in its colloquial meaning as synonymous with naive idealism.

the symbolic detachment of Utopia from the rest of the world occurs when the legendary Utopus, having conquered the former country of Abraxa and established an ideal community, cuts through the isthmus that connected it to the mainland, turning Utopia into an island. In the case of Tsiolkovsky's "hot-house homes," the physical distance from Earth is compounded by strict criteria according to which the community's members are selected. As the author asserts: "The best people had been selected as settlers: people who were easy to live with, gentle, resourceful, hard-working, physically tough, not too old, and if possible without domestic ties. [...] They had received the reward, so to speak, for the good qualities which had led to their selection back on Earth."³² In addition, the colonists were to include mainly scientists, technicians and engineers of various specialities. The exclusivity was also symbolised by a certain rite of passage that everyone desiring to live in the utopia was subjected to upon arriving at the station. It consisted of learning to move in zero gravity using special wings attached to hands.³³

The exclusive inaccessibility of the space utopia becomes apparent to the very protagonists who, having returned home covered with glory and fame as benefactors of humanity, are refused access to these stellar "hot-house homes." Their reliability as scientists demands that they complete their scientific journey and return to Earth with the results and samples of many years of exploration. Their disappointing return to a planet where "[t]he Sun had no warmth [...] The sky was too cloudy; at night, the stars were far away, too few and too faint"³⁴ can be soothed only by scholarly reputation and ethical awareness of bringing mankind closer to the age of reason, and thus to moral and social perfection. Such is the fate of a scientist.

Science and technology in Konstantin Tsiolkovsky's utopia

Can science and technology become factors working to improve humanity both in the physical and moral aspect? Tsiolkovsky was absolutely certain that this was the case. Based on his scientific intuition and "optimistic" epistemology, he devised his own creative method which he called a triad of dream, theory, and experiment. According to Tsiolkovsky, within this triad, visions and ideas arising in the mind of the creator were potent enough to transform the world. He described it thus: "First, the necessary element is thought, fantasy, fairy tale. They are followed by scientific calculations. The crowning moment is the experience... More than everyone else, I am aware of the gap between idea and actuality [...] And yet, it is always so that doing is preceded by thinking, an accurate calculation by fantasy."³⁵

³² Tsiolkovsky, *Beyond the Planet Earth*, p. 158, 161.

³³ *Ibid.*, p. 161.

³⁴ *Ibid.*, p. 190.

³⁵ Ciechanowicz, *op. cit.*, p. 28.

Such a methodological approach, one of the instruments of scientific perfection, is also offered by the novel's protagonists. The exultation of Ivanov, the man who came up with the idea of space flight (and stands in for Tsiolkovsky himself), is shared by the other scientists only after a series of discussions about various stages of the project, university-level lectures on astronomy, and even precise calculations of relationships between the speed of the rocket and time, distance and consumed fuel, which take up the first part of the novel. The space journey itself is the crowning of the entire research process, a supreme experiment that is to unambiguously confirm all the visionary ideas of Ivanov/Tsiolkovsky.

In the outcome of the process, the protagonists gain knowledge, while humanity gains a new quality of life represented by the utopian community in space. The community takes the form of a network of technologically advanced stations built from metal and silicon, connected a few at a time into a star-shaped whole and then combined into a yet higher structure. The stations are covered by a special paint that absorbs stellar energy, and because they unceasingly but slowly spin on their axes, they can always bask in sunlight. The habitat consists of various modules, which depending on their function include residential quarters with public and private areas, greenhouses whose humidity, air composition and gas pressure are ideal for growing fruits and vegetables, as well as workshops and manufactures which, thanks to high temperatures achieved through convex mirrors, allow "operating various kinds of solar engines, welding metals and performing a great many manufacturing operations without the use of fuel."³⁶

The stations are a perfect place to live in. The spacious residential quarters are kept quite warm because of harvested solar energy. The residents, therefore, do not need to wear layers of clothing, being instead dressed in light girdles. The space community is a society free from disease thanks to careful selection of its inhabitants back on Earth. Work in the utopia is reduced to a minimum, consisting only in operating the station and supervising the technical conditions of human existence, maintaining order, producing food, or making repairs. Tasks are assigned to inhabitants according to their interests, willingness, and physical capacity, leaving everyone else to manage their time as they see fit. Accordingly, the people engage mostly in scientific and artistic pursuits.³⁷

The cosmic utopia also reflects the socialist thinking of its creator. Each inhabitant has similar belongings, because the community is run based on mutual cooperation, altruism and shared property. Driven by the belief that human life is realised fully in the collective, society in the utopia is organised along modules/colonies consisting of 400 people. These colonies form the foundation of a political system that resembles a mix between local government and centralised collectivism. Each colony selects twenty deputies according to gender and age criteria,

³⁶ Tsiolkovsky, *Beyond the Planet Earth*, p. 88

³⁷ *Ibid.*, s. 161.

so that there are delegates of boys and girls, men, women and old people, but also of those who have spouses and families, and single men and women. Out of themselves, the deputies select a few to form the supreme council of the colony, whose members participate in the decisive body of a higher level that rules the entire community.³⁸

Considering that Tsiolkovsky's overarching objective was to answer the question of how to make man perfect, "ensure mastery over the forces of nature, become familiarised with space and provide conditions for new vistas in human life as the most perfect creation of the universe,"³⁹ his space utopia was never meant to remain just a literary fantasy. By consequently following the premises of his scientific method, the author persistently supported his utopian dreams by formulating scientific theories, including a mathematical theory of rocket flight that takes into account its mass in motion, or the jet engine theory,⁴⁰ as well as experimental research which resulted in the dirigible and the wind tunnel mentioned above. The research activity driven by the triad was also a circular process, in which dreams led to theories and experiments, and these to new dreams. Ciechanowicz concludes that "the idea – which Tsiolkovsky called 'mechta,' a dream – does not appear in science as a sterile flight of fancy, but as a qualitative leap that occurs in the mind of the scientist based on a profound mastery of the entire body of knowledge in some field and semi-intuitive awareness that such familiarity is not sufficiently grounded in philosophical terms. Only having climbed the summit can the scientist survey an idea that opens new points of view or interpretations of some part of reality."⁴¹

For Tsiolkovsky, the research process was endless, constantly evolving towards perfection. Accordingly, his cosmic utopia could not yet be regarded as complete either. Although it offered perfect living conditions to its inhabitants, as a community it still had a ways to go. In contrast to the classic utopias, Tsiolkovsky's featured inevitable technological and scientific progress that was to allow the space community to reach new levels of perfection in physical, industrial, and scientific terms. Following the assumptions of his cyclical creative method, Tsiolkovsky equipped his utopian vision with the potential for unceasing technological progress that was to guarantee severing all ties to Earth and setting out towards another perfection, in which "many of our descendants will find shelter, happiness and complete moral contentment out in the skies."⁴²

³⁸ Ibid., pp. 163–164.

³⁹ Ciechanowicz, op. cit., p. 170.

⁴⁰ He presented the foundations of this theory in his 1903 article entitled "Exploration of the Universe with Reaction Machines" ("Исследование мировых пространств реактивными приборами").

⁴¹ Ciechanowicz, op. cit., p. 28.

⁴² Tsiolkovsky, *Beyond the Planet Earth*, p. 188.

Summary

By abandoning the static views of its predecessors, Tsiolkovsky's utopia presented a perfect political system that was capable of unlimited progress and continuous improvement. Similar to the above-mentioned *A Modern Utopia* by Herbert George Wells (1905), it thus became the cornerstone of a dynamic techno-utopia in which advanced science and technology ceased to act as mere symbols of perfect society and became the driving force behind the entire process of perfecting human life. Thus understood, the technological society still bears witness to the extreme confidence placed in mankind and its opportunities for social and moral advancement, as well as to the unshaken trust in science and the research method that may become a chance to reach the stars – literally and metaphorically.

Unlike the concept of Wells, Tsiolkovsky's vision takes a decided position on its feasibility. Its creator is absolutely certain that the cosmic utopia is one day going to become reality. The only unknown is when. The author is perfectly aware of the breakthrough and revolutionary nature of his visions which, in order to actualise, must inspire the social masses and political elites of the future. Science-fiction literature, thanks to its popularising and educational values, becomes a capable vehicle for achieving this objective. Thus, Tsiolkovsky's cosmic vision meets the condition of a heroic utopia. The nascent scientific revolution, although taking place in the God-forgotten Russian towns of Borovsk and Kaluga, was to spread to the whole world. The twentieth-century story of space flights, which culminated in 1998 with the construction of the International Space Station, convinces us that Tsiolkovsky might once again have been right.

Abstract

The oeuvre of Konstantin Tsiolkovsky (1857–1935), one of the most eminent scientists of his age, considered the father of astronautics, proponent of the idea of rocket propulsion and the theory of variable-mass rocket flight, spans over 200 works on physics and philosophy. However, only a single work of his has the nature of a science-fiction novel. In *Beyond the Planet Earth*, published in 1920, he presented an ideal vision of humanity which a century after the present day is living in peace and universal harmony in space. The scientist's utopian vision became a connection of sorts between his treatises on physics and astronautics and his philosophical output. At the same time, his scientific discoveries related to exploration of the universe preceded the first manned flights by almost half a century. In the present article, the author attempts to answer the question about the nature of the ideal society described by Tsiolkovsky in *Beyond the Planet Earth*. The specific character of this vision will be discussed not only through recapitulating its key features, but also by analysing their connections with the Tsiolkovsky's hallmark cosmophilosophical monism and his methodologically naturalistic approach to scientific research. For this purpose, the utopian traits of Tsiolkovsky's vision will be highlighted and analysed, with particular emphasis on the scientific and technological dimensions of the idea, which will allow to not only view the concept in terms of technological utopia, but also determine to what extent this vision reached beyond the framework of the classic utopias and became a heroic one.

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Marcin Pomarański, political scientist and philosopher. He specialises in the contemporary political doctrines and political movements, relations of politics and religion as well as political utopia.

(mpomaran@gmail.com, marcin.pomaranski@poczta.umcs.lublin.pl)