

CITIZEN OF THE UNIVERSE.
KONSTANTIN TSIOLKOVSKY'S COSMIC PHILOSOPHY
AND SCIENCE FICTION

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Abstract

The paper discusses Konstantin Tsiolkovsky's philosophy as it can be reconstructed from his writings of two kinds, the academic papers and the works generally, though not always correctly, classified as science fiction. It is stressed that Tsiolkovsky belongs to the large school of Russian philosophers known as the Cosmists, and he is placed within the group of 20th century academic-minded Cosmists. The first part of the paper reconstructs Tsiolkovsky's cosmic philosophy on the basis of his philosophical works, which amount to half of his published works. The second part of the paper discusses all the works by Tsiolkovsky available in English under the science fiction label. The paper also contains comparisons of Tsiolkovsky's views with the philosophical-religious system propagated by Nicholas and Helena Roerich, known as Agni Yoga, and its ancient Indian roots. It is also mentioned that Tsiolkovsky played an important role in the development of the early Russian, or more properly Soviet, science fiction movies. The paper stresses that Tsiolkovsky always based his writings on solid scientific foundations, so that the label "science fiction" does not always apply to them.

Key words

Agni Yoga, Konstantin Tsiolkovsky's life and works, the Russian Cosmists, cosmic philosophy, the limitations of "science-fiction" label, theosophy.

Abstrakt

Artykuł omawia filozofię Konstantego Ciołkowskiego na podstawie jej rekonstrukcji w oparciu o dwa rodzaje jego pism, prace naukowe i prace z reguły, choć nie zawsze poprawnie, klasyfikowane jako fantastyka naukowa.

Podkreśla się, że Ciołkowski należał do dużej szkoły filozofii rosyjskiej znanej jako kosmiści: określone zostaje jego miejsce wśród XX-wiecznych kosmistów o nastawieniu naukowym. W pierwszej części artykułu autor dokonuje rekonstrukcji kosmicznej filozofii Ciołkowskiego na podstawie jego pism filozoficznych, które stanowią połowę jego opublikowanego dorobku.

W drugiej części omówiono wszystkie dzieła Ciołkowskiego dostępne po angielsku i klasyfikowane jako science-fiction. Artykuł zawiera także porównania filozofii Ciołkowskiego z filozoficzno-religijnym systemem propagowanym przez Mikołaja i Helenę Rerichów, znanym jako Agni Joga, i jego staroindyjskimi korzeniami. Autor podkreśla że Ciołkowski odegrał ważną rolę w rozwoju wczesnego rosyjskiego, a – ściśle mówiąc – radzieckiego kina science fiction oraz zaznacza, że Ciołkowski opierał swe rozważania filozoficzne na solidnych podstawach naukowych, a zatem etykieta science fiction nie zawsze do jego pism pasuje.

Słowa kluczowe

Agni Joga, Konstanty Ciołkowski – życie i twórczość, rosyjscy kosmiści, filozofia kosmiczna, ograniczenia etykiety „science fiction”, teozofia.



Plate One: *Vselennaya, The Infinite Universe*. [Online:] <<https://www.shutterstock.com/search/symbols>> (access 1.06.2017).

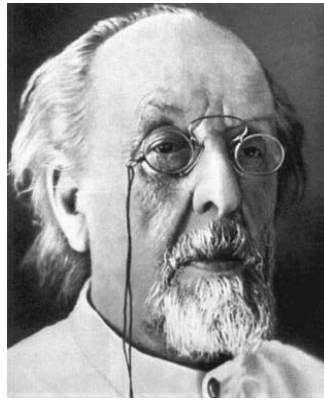


Plate Two: *Konstantin E. Tsiolkovsky 1857–1935*. [Online:] <<https://alchetron.com/Konstantin-Tsiolkovsky>> (access 1.06.2017).

Thought goes before action, and imagination before exact computation.

K. Tsiolkovsky, *The Exploration of Outer Space Using Jet-Propelled Rockets* (1903)

I am not only a materialist, but also a panpsychist, recognizing the sensitivity of the entire universe. This quality I count indivisible from matter. All is alive, but only conditionally do we count it alive, meaning, only that which has the capacity to sufficient feel.
K. Tsiolkovsky, *Monism of the Universe* (no date)

There is an Oriental riddle,
“What is it that likes to be buried?”
Answer: “A seed.”

Agni Yoga, *Illumination* (1925), verse 3:2:19

If you are asked, “How do you picture the universe?”
answer, “As a drop of water”.

Agni Yoga, *Illumination* (1925), verse 3: 4: 5

Abbreviations and acknowledgements

Abbreviations used in this paper refer to the most complete edition of Tsiolkovsky's philosophic works available online:

TOR – tsiolkovsky.org/ru/nauchnoe-nasledie

TOE – tsiolkovsky.org/en/cosmic-philosophy-by-tsiolkovsky

I acknowledge my gratitude to the creators of the above portal for making the philosophical and literary works by Tsiolkovski readily available.

Introductory

This paper was long in coming. Its origins go back to December 6th, 1997, when I bought a secondhand copy of the Polish translation of Tsiolkovsky's¹ science fiction

¹ There are two Romanizations of his name in current use, *Tsiolkovski* and *Tsiolkovsky*.

novel *Vne Zemli*², described on the back cover as Tsiolkovsky's only science fiction novel. The book both fascinated and intrigued me. I referred to it in my wife's and mine paper of 2007³ and then again, this time on my own, in 2016⁴, but I felt certain the "real" work on Tsiolkovsky's philosophy was still to come. The problem was the sources. The original Russian editions of Tsiolkovsky's works are generally unavailable in Poland. Fortunately, an almost complete collection of his philosophical and literary works proved available on the web⁵. There are also some books by and about Tsiolkovsky available in English, including a selection of his science fiction works and the translation of the second volume of his *Izbrannyye Trudy* (=Selected Works, Moscow 1954) that contains his most famous scientific and rocketry works⁶. The study of the Russian Cosmist philosophy by George M. Young also proved of great help⁷. Many times comparisons between Tsiolkovsky's philosophy and the system known as *Agni Yoga*⁸ that we owe to Helena and Nicholas Roerich were almost forcing themselves in, so I let them come. Young devotes a few pages to Tsiolkovsky, but mentions the Roerichs only twice and cursorily. Maria Carlson's history of Theosophy in Russia⁹ does not

² K. Ciołkowski. *Poza Ziemią*. Warsaw: Iskry, 1979, translated by Andrzej Bień, with the space paintings by Alexei Leonov, the first man who "walked" in outer space, and Andrei Sokolov, one of the best known Russian science-fiction painters, as illustrations.

³ M. Gdok-Klafkowska, P. Klafkowski. *Mysł o przyrodzie w filozofii rosyjskiej. Szkice do portretu*. [In:] Ekorozwój i Agenda 21, Interdyscyplinarny model kształcenia, pp.135–146. Ed. by Piotr Pieczyński. Szczecin: Collegium Balticum, 2007.

⁴ P. Klafkowski P. *Czy ludzkość ma jeszcze szansę? Konstancy Ciołkowski, Mikołaj Roerich i Danił Andrejew*. [In:] *Dialog kultur i społeczeństw*. Ed. by B. Afeltowicz, J. Miturska-Bojanowska, H. Walter. Szczecin: Volumina pl, 2016, pp. 83–92.

⁵ In Russian: [Online] <tsiolkovsky.org/ru/nauchnoe-nasledie> (access 1.06.2017). In English: [Online] <tsiolkovsky.org/en/cosmic-philosophy-by-tsiolkovsky> (access 1.06.2017). This page is available in both Russian and English, but they are not identical. The Russian texts are complete and currently (19.05.17) contain 210 titles. The English version of this page currently (=same day) features 10 texts in abridged summarizing translations. At the moment, it is the most complete collection of Tsiolkovsky's philosophic writings available in any form.

⁶ A very special feature of this volume is the introductory essay by Sergei P. Korolyov (1907–1966), the legendary „Chief Constructor”, the creator of the USSR space program, the man whose name and whereabouts were kept top secret as long as he was alive. The essay is based on his lecture commemorating Tsiolkovsky's birthday centenary in 1957. Indeed, the right man for the job! The lecture was given on September 17th, and three weeks later, on October 4th, *Sputnik One* launched the space age, followed by the flight of Laika in November 1957, the happy landing of Belka and Strelka in August 1960 and Yuri Gagarin's flight in April 1961. Korolyov was the brain behind all the four. For the importance of Tsiolkovsky in the development of the USSR space program see: R.D. Launius, J. Logsdon, Robert W. Smith. *Reconsidering Sputnik: Forty Years Since the Soviet Satellite*. London: Routledge, 2000.

⁷ G.M. Young. *Russian Cosmists, the Esoteric Futurism of Nikolai Fedorov and his Followers*. Oxford: Oxford University Press, 2012.

⁸ *Agni Joga, učenje živoi etiki*. 2 vols. Moskva: Eksmo, 2003.

⁹ M. Carlson. *No Religion Higher Than Truth, A History of the Theosophical Movement in Russia, 1875–1922*. Princeton: Princeton Legacy Library, 1993.

mention Tsiolkovsky¹⁰, but he appears many times in Bernice G. Rosenthal's history of the occult in Russia and the USSR¹¹.

Those who know Tsiolkovsky only as the founder of astronautics and the author of the *Tsiolkovsky equation*¹² of 1903 may be surprised that over half of his works are devoted to philosophy and broadly understood science fiction: well over 200 philosophical papers and 10 literary works are attributed, not always correctly, to science fiction genre. Tsiolkovsky himself admitted having been an avid reader of Jules Verne¹³, and in an autobiographic sketch of 1928 he wrote: "Our sphere is the sphere of speculation, to hypothesize. But how are we to walk along an untapped and unknown and still dark route of a scientific technical concept unless we illuminate this route with the light of science fiction?"¹⁴. During his three years in Moscow he got to know Nikolai F. Fedorov (1829–1903), the most famous Russian Cosmist philosopher¹⁵, and Dmitri I. Pisarev (1840–1868)¹⁶, the well-known political writer, whose influence is clearly seen in his own works.

Scattered throughout Tsiolkovsky's autobiographic writings there are remarks on his psychic experiences¹⁷. He felt his life was guided by some higher powers, and though a declared materialist, he saw no contradiction between materialism and the

¹⁰ This is interesting, as Carlson says that the Kaluga branch of the Russian Theosophical Society, founded in 1906, was the second most important one in Russia after St. Petersburg (M. Carlson. *No Religion Higher...*, p. 63). Tsiolkovsky settled in Kaluga in 1892 (D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist and His Cosmic Philosophy*. Publisher and place not given. ISBN 978-1-365-25981-4, copyright 2016, p. 144) and it seems unlikely he did not attend some of their meetings.

¹¹ G.B. Rosenthal (Ed.). *The Occult in Russian and Soviet Culture*. Ithaca and London: Cornell University Press, 1997.

¹² This equation interrelates the exhaust, velocity, and mass of a rocket that moves on the jet principle. Though the basic mathematics of jet propulsion had been known earlier, Tsiolkovsky was the first who applied it to the concept of a rocket breaking the force of gravity and leaving the Earth. Without this equation, there would be no space flights.

¹³ He came across Verne's novels in the the Chertkovski Library in Moscow, where he lived 1873–1876 (A.A. Blagonravov (Ed.) *Selected Works of Konstantin E. Tsiolkovsky*. Honolulu: University Press of the Pacific, 2004, pp. 83–84). He was so impressed by the novel "Round the Moon" that he calculated the force of the gun described by Verne to send the rocket on the way and concluded it would kill all the passengers (D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 70).

¹⁴ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist and His Cosmic Philosophy...*, p. 157.

¹⁵ See: G.M. Young. *Nikolai Fedorov, an Introduction*. Balmont: Nordland Publishers, 1979. G.M. Young. *Russian Cosmists, the Esoteric Futurism of Nikolai Fedorov and his Followers*. Oxford: Oxford University Press, 2012.

¹⁶ It may be a coincidence of names, but according to Carlson (M. Carlson. *No Religion Higher...*, p. 63), the Kaluga branch of the Russian Theosophical Society was set up by one Nikolai Pisarev (no source known to me gives the dates of his life) and his wife Elena (1855-1944). Pisarev owned the Lotus Publishing House, the first Theosophic printing press in Russia. I could not find out whether Tsiolkovsky's friend and the Kaluga family were relatives. Elena Pisareva does not mention Tsiolkovsky in the chapter on Kaluga in her memoirs (E.F. Pisareva. *The Light of the Russian Soul: A Personal Memoir of Early Russian Theosophy*. Wheaton: Quest Books, 2008, pp. 34–39).

¹⁷ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, pp. 163–164, 176–177, 263–264.

spiritual phenomena. He admitted he was a lunatic¹⁸ as a child¹⁹. He remembered that when he read H.G. Wells's *War of the Worlds* something strange happened to him: "... all of a sudden a tune and words materialized within me, one that I never heard before, yet it corresponded with the destruction of humanity and complete hopelessness"²⁰. As far as his religious views are concerned, Tsiolkovsky was ready to accept Jesus Christ as the highest moral authority but not as a divine being²¹. In his paper of 1931 titled *Is There God?* he equals God with the universe²².

Other motives that reappear in his autobiographic writings are the difficulties caused by poverty and almost full deafness, the problems of convincing the academic world to new ideas, and the overall need of iron will and persistence. He writes "We love to embellish the childhood of the great people, but this is not entirely artificial, but the invention of a preconceived opinion"²³. This passage comes from his last autobiographic sketch, written in 1935, when he was a recognized authority and could rightly feel a great man, but he never forgot the days he could not afford a warm coat for Moscow winters and had almost nothing to eat. He recollects:

I remember very well that I had nothing to eat but brown bread and water. I would go to the baker's once in three days and buy 9 kopeks' worth of bread. In this way I spent on bread 90 kopeks a month. For all this, I was happy with my ideas, and my diet of brown bread did not damp my spirits²⁴.

In the present paper, I refer mostly to the source works in English, in particular to Daniel H. Shubin's *Tsiolkovsky. The Cosmic Scientist and His Cosmic Philosophy*, as these are more easily available to me. Wherever it was possible, I checked the English translations against the Russian originals. I am going to give details of Tsiolkovsky's biography only when necessary, since detailed accounts of his life are easily available online both in Russian and in English. I refer the interested readers to D.H. Shubin's *Tsiolkovsky. The Cosmic Scientist and His Cosmic Philosophy*²⁵, which is an exceptionally useful and easily available source containing Tsiolkovsky's selected autobiographical and philosophical works.

The Cosmists and Their Philosophy

The philosophy developed by Tsiolkovsky can be placed, though not without some difficulty, in the so-called Russian Cosmism. What is Cosmism? It is a characteristically Russian branch of the philosophy of Nature that originated in the Russian Enlight-

¹⁸ This term stresses the supposed sensitivity of the subject to Luna, that is the Moon, which the term "sleepwalker" does not indicate.

¹⁹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 119.

²⁰ Ibidem, p. 146.

²¹ Ibidem, p. 74.

²² More about it later on.

²³ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 117.

²⁴ A. Kosmodemyansky. *Konstantin Tsiolkovsky. His Life and Work*. Honolulu: University Press of the Pacific, 2000, p. 11.

²⁵ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*

enment of the 18th century, reached its peak in the second part of the 19th century and has many eminent continuators today.

The basic tenets of Cosmism common to all its branches are few: the Cosmos is a living, conscious and self-conscious entity; as planet Earth, we are a part of it; whatever happens in the Cosmos affects us and our planet in various ways; the development of life is inseparably connected with the activities of the Cosmos; man is a divine being and should act in agreement with the Cosmic principles, which are love, understanding, freedom and mutual respect. At the turn of the 19th/20th centuries the group divided into two, one concentrating on the religious and Orthodox Christian significance of the above principles, the other on science and scientific validation of the same principles. In this paper, we are primarily interested in the second group.²⁶

George M. Young, the foremost authority on Cosmism in English, suggests the following chronology which clearly shows the place of Tsiolkovsky in Cosmism:

a/ the beginnings – Mikhail V. Lomonosov 1711–1765

Gavrila R. Derzhavin 1743–1816²⁷

Alexander N. Radishchev 1749–1802

Vasily N. Karazin 1773–1842²⁸

Prince Vladimir F. Odoevsky 1803–1869

Alexander V. Sukhovo-Kobylin 1817–1903

b/ **Nikolai F. Fedorov** 1829–1903²⁹, the most important Cosmist philosopher following whom the school divided into two distinct groups:

c/ the religious branch

Vladimir S. Solovyov 1853–1900

Sergei N. Bulgakov 1871–1944

Pavel A. Florensky 1882–1937

Nikolai A. Berdyaev 1874–1948

d/ the scientific branch

KONSTANTIN E. TSIOLKOVSKY 1857–1935

Vladimir I. Vernadsky 1863–1945

Alexander L. Chizhevsky 1897–1964

Vasily F. Kuprevich 1897–1969

e/ twentieth-century Cosmists

Nikolai P. Peterson 1844–1919

Vladimir A. Kozhevnikov 1851–1917

Alexander K. Gorsky 1886–1943

Nikolai A. Setnitsky 1888–1937

²⁶ See: Semenova S.G., A.G. Gačeva (Ed.). *Russkij komizm: antologija filosofskoi mysli*. Moskva: Pedagogika-pres, 1993. This work, unavailable to me at the time of writing this paper, seems to be the most recent anthology of Cosmist philosophy. Its list of contents is given in Russian-language Wikipedia, the address is the book's title (access 20.05.2017).

²⁷ He is usually called the second greatest Russian poet after Alexander Pushkin.

²⁸ Should not be confused with the famous Russian historian Nicolas M. Karamzin 1776–1826.

²⁹ All the five histories of Russian philosophy available in Polish discuss him in various ways, and comparing them is a good key to understanding how unique his ideas were in the Western world and how differently various scholars reacted to them. See bibliography, Russian Philosophy and Science, at the end of this paper.

Valerian N. Muravyov 1885-1932
 Vasily N. Chekrygin 1897-1922
 Lev N. Gumilev 1912-1992.

As one can see, the list contains some of the most famous Russian scientists and philosophers, which testifies to the importance of the Cosmist philosophy in Russian culture.

As many of the later Cosmists have been influenced by Theosophy, some names should be added to complete the above list, namely:

Helena P. Blavatsky 1831–1891, the founder of modern Theosophy
 Nicholas K. Roerich 1874–1947
 Helena I. Roerich 1879–1955
 Pyotr P. Fateev 1891–1971 (A)³⁰ the founder of the Amaravella group³¹,
 Alexander P. Sardan 1901–1974 (A)
 Sergei I. Shigolev 1895 - disappeared after being arrested in 1942 (A)
 Vera N. Pshesetskaya 1879–1945/1946 (died as deportee in Archangelsk, exact date unknown) (A)
 Viktor T. Chernovolenko 1900–1972 (A)
 Boris A. Smirnov-Rusetski 1905–1993 (A).

One of the most amazing Cosmist cosmologies has been presented by *Daniil L. Andreev* (1906–1959) in his masterpiece, *Roza Mira*³². It is based on the principle of parallel universes and time-streams, a giant net of space-time systems that are interpenetrating, though each is a self-sufficient world in itself. One of the principal assumptions of *Roza Mira* is that our own planetary system is a part of that giant Whole and is affected by what happens on other space-time planes³³. The cosmology of *Roza*

³⁰ (A) means the member of the Amaravella Group.

³¹ The Amaravella was a group of artists that existed 1920 (1923?) – 1930. Though all its six members are known primarily as painters, their works are closely connected with the Cosmist philosophy which they developed in their own individual ways. Nicholas Roerich was a friend and supporter of the Amaravella, and many paintings by the group's members show stylistic similarities to Roerich's art. The name *Amaravella* is a Sanskrit word meaning "The Sprouts of Immortality", but the group was also known as "The Cosmists" or "Cosmist Painters". The elements unifying the group were N.F. Fedorov's philosophy, Helena Blavatsky's Theosophy, and besides Roerich, three eminent artists of Russia: Nicolas K. Čurlionis (a Lithuanian painter and composer, 1875–1911), Victor E. Borisov-Musatov (painter, one of the founders of Russian symbolism, 1870–1905) and Mikhail A. Vrubel (probably the most famous Russian symbolist painter, 1856–1910).

³² D.L. Andreev. *Roza Mira*. Moskva: Mir Uranii, 2000; D.L. Andreev. *The Rose of the World*. Lindisfarne Books, 1997; D.L. Andreev. *Roza Mira, die Weltrose*. 3 volumes. Vega e. K., 2008–2009. First complete edition in Russian 1991, English translation 1997 (incomplete), German translation in 3 volumes 2008–2009 (complete). The list of Shubin's works in D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...* includes a translation of Andreev's work, *The Rose of the World*, but I have no access to it, and Mr. Shubin did not answer my e-mails sent at the address given in D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...* I cannot say whether his translation is complete or not.

³³ Andreev's cosmology forms the general framework of one of the most interesting recent Russian philosophical science fiction novels, the trilogy *Spasiteli Veera* by Vasilii Golovačev, two of its three volumes being also available in the Polish translation *Obrońcy wachlarza*: V. Golovačev. *Spasiteli*

Mira has been compared to Dante's *Divine Comedy*³⁴ and Swedenborg's *De Caelo et ejus Mirabilibus, et de Inferno ex Auditis et Visis* (1758)³⁵, but this is no place to go deeper into such comparisons³⁶. It seems interesting that Young does not mention Andreev even once³⁷. However, he definitely belongs in the religiously oriented line of Cosmists, as his many references to Vladimir Solovyov indicate. On the other hand, Andreev is very little, if at all, influenced by Theosophy and the Indian philosophies. He mentions Theosophy only once, the context suggesting he did not entirely approve of it³⁸.

Though he was neither a Russian nor a Cosmist, the Indian polymath *Jagadish Chandra Bose* (1858–1937)³⁹ just cannot be left unmentioned in this context, his ideas being extremely close to the views of Tsiolkovsky and Vernadsky in both scientific and religious aspects. Bose's universalism springs from the classical Indian philosophy, which always stressed the fundamental unity of Nature, presenting man as nothing but a small part of a Great Whole, and planet Earth as only one of untold number of planets in an untold number of parallel universes that harbor intelligent life. The same ideas can be found in Cosmism, and since the Cosmists could not have known Bose's works (Bose's selected works appeared in the Russian translation only in 1964) this parallelism indicates the importance and probability of these views.

Veera, one-volume edition. Moskva: Eksmo, 2004; W. Gołowaczew. *Wirus mroku* (cykl *Obrońcy wachlarza*, tom 1) i *Wysłannik* (cykl *Obrońcy wachlarza*, tom 2) Olsztyn: Wydawnictwo Solaris, 2005.

³⁴ The edition generally regarded as best is: A. Dante *Le Opere di Dante*. A cura di M. Barbi et al. Firenze: Testo Critico della Società Dantesca Italiana, Bemporad et Figlio- Editori, MCMXXI. This edition contains an excellent explanatory index of personal and place names. I have no access to the *Divine Comedy* in English.

³⁵ E. Swedenborg. *De Caelo et Ejus Mirabilibus et de Inferno ex Auditis et Visis*. Whitefish: Kessinger Publications, 2009. The English translation: E. Swedenborg. *Heaven and its Wonders, and Hell from Things Seen and Heard*. London: The Swedenborg Society, 1958.

³⁶ On Andreev and his cosmology see: P. Klafkowski. *Od kultur do metakultury, refleksje nad dziełem Daniła Andrejewa „Roza Mira”*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve međdukul'turnyx kommunikatsii*. Ed. by K. Janaszek, J. Miturska-Bojanowska, R. Gawarkiewicz. Szczecin 2012: Grafform, pp. 74–79; P. Klafkowski. *Opisując nieopisywalne: Światy i zaświaty Daniła Andrejewa*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve međdukul'turnyx kommunikatsii...*, pp. 122–132; P. Klafkowski. *Czy ludzkość ma jeszcze...*, pp. 83–92.

³⁷ G.M. Young. *Russian Cosmists...*

³⁸ See *Roza Mira...*, p. 19 (in Russian), *The Rose...*, p. 20 (in English), and *Roza Mira Die Weltrose...* vol. 1, p. 44 (in German), where Andreev says that Theosophy, Anthroposophy and Masonry are “like a bouquet, of various flowers of truth eclectically picked from every imaginable religious glade.”

³⁹ See: Peter Tompkins and Christopher Bird. *The Secret Life of Plants*. London: Penguin Books, 1974, Chapter 6: *Plant life magnified a hundred million times*, pp. 81–96, for a more detailed account of Bose's life and incredible discoveries, and p. 323 for the list of Bose's most important works in English (Bose was a Bengali and wrote in both his mother tongue and in English). Incidentally, he was also a pioneer of Bengali science-fiction, which makes him even more similar to Tsiolkovsky.

Tsiolkovsky's Science-Fiction Works

It is rather difficult to distinguish Tsiolkovsky's purely philosophic works from science-fiction. The following list is based on *The Science Fiction of Konstantin Tsiolkovsky*⁴⁰, edited by Adam Starchild⁴¹, but the works are listed in the chronological order of writing. The English titles follow *The Science Fiction of Konstantin Tsiolkovsky*, while chronology is based on the list given in TOR. Most of these works are now available in separate editions in Russian, and a few also in English, which I have no access to⁴². Let us note that Adam Starchild was not the editor's real name⁴³.

The title of the volume edited by Starchild is rather misleading because, as we shall see, only *one* of the works included is an actual science-fiction novel⁴⁴ while all the others fall into the category aptly called by Shubin "Cosmic Philosophy". In fact, Starchild's *The Science Fiction of Konstantin Tsiolkovsky* and D.H. Shubin's *Tsiolkovsky, The Cosmic Scientist and His Cosmic Philosophy* are both Tsiolkovsky's selected philosophic works, perfectly complementary to each other. Taken together, they contain all the basic sources for the study of Tsiolkovsky's life and philosophy.

1886 – *Vne Zemli/Outside the Earth*. Written in 1886, serialized in journals 1918, published as a book in 1920⁴⁵.

1887 – *Na Veste/On Vesta*. Written in 1887, published 1893.

1887 – *Na Lune/On the Moon*. Written in 1887, published in 1893⁴⁶.

1894 – *Izmennye otnositelnosti tyazhestv na Zemle/Changes in Relative weight*.

1916 – *Gryozy o Zemli i Nebe/Dreams of Earth and Sky*⁴⁷.

1920 – *Biologia karlikov i velikanov/Biology of Dwarfs and Giants*. Manuscript.

⁴⁰ A. Starchild (Ed.). *The Science Fiction of Konstantin Tsiolkovsky*. Honolulu: University Press of the Pacific, 1979.

⁴¹ The English volume gives neither the translator's name nor the particulars of the Russian original. Judging by the comparison of various Russian editions available on the web, it seems to me that A. Starchild (Ed.). *The Science Fiction...* is the translation of Tsiolkovsky's *Put' k zvezdam*. Moscow: USSR Academy of Sciences, 1960.

⁴² These can easily be found on the web, Amazon page in English, *Tsiolkovsky naučno-fantastičeskie rasskazy* in Russian Wikipedia (access 5.05.2017).

⁴³ His real name was Malcolm Willis McConahy, 1946–2006. He was a financial fraudster, a leading figure in the "perpetual traveler" tax-avoiding movement, a prolific writer on taxes, offshore matters and finances, and was jailed in both UK and US for financial and homosexual offences. He changed his name to "Adam Starchild" around the year 1975. His edition of Tsiolkovsky's science-fiction works is his only venture into this field.

⁴⁴ This is *Outside the Earth*, a complete novel. We might put parts of *Dreams of Earth and Sky*, *On Vesta*, and *Changes in Relative Weight*, in the same class, but all the other titles are more academic than literary.

⁴⁵ Also available in the Polish translation by Andrzej Bień: K. Ciołkowski. *Poza Ziemią*. Warsaw: Iskry Publishers, 1979.

⁴⁶ A different translation of the same is found in D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, pp. 297–333.

⁴⁷ There is a distinction here that does not exist in English. The Russian word "gryoz" means a dream, but a dream experienced when sleeping. A dream of something that we experience when we are awake is called "mečta". Compare the Polish words "sen" and "marzenie".

- 1920 – *Za atmosferoi Zemli/Beyond the Earth's Atmosphere*.
 1928–1933 – *Efirnyi Ostrov/Island of Ether*. Typescript.
 1929 – *Tseli Zvezdoplavanya/The Aims of Astronautics*.
 1929 – *Zhivotnoe Kosmosa/Living Beings in the Cosmos*.
 1930 – *Izobretatelam reaktivnykh mashin/To Inventors of Reaction-Propelled Machines*.
 1935 – *Tol'ko li fantazia?/Is This Mere Fantasy?*

The last two titles, added by Adam Starchild as supplements, are not, strictly speaking, literary works. The one of 1930 is Tsiolkovsky's answer to all his readers who kept sending him their own inventions of jet-transport vehicles. The one of 1935 is Tsiolkovsky's brief reflection on the possibility of space travel inspired by filming his *Vne Zemli* in 1935⁴⁸.

A word should also be said about Tsiolkovsky's work of 1883, titled *Svobodnoe prostranstvo / Free Space*⁴⁹. Written in the form of a diary kept by a scientist working on gravity and extending from 20th February through 12th April 1883, it is half-way between a literary and a scientific text. It is difficult to say what readers Tsiolkovsky had in mind – the work was not printed during his lifetime – but it clearly shows his gifts as a teacher able to explain highly complex problems in the way that can easily be understood by non-specialists. An example:

February 24, 1883. In free space the object under observation neither exercises pressure on its support nor experiences any from it... In free space there is no distinction between top and bottom. You could not say "I get up" or "I get down"; "I am higher up" and "You are down below". There the pendulum would not vibrate and the clock would not go. Time, however, could be measured by means of watches, i.e., such timepieces whose pendulums vibrate not under the impact of gravity but owing to the resilience of a steel spring⁵⁰.

Tsiolkovsky's Philosophic Works

The most complete list of Tsiolkovsky's philosophic works in Russian is given in TOR; titles are listed in the alphabetic order of the Russian alphabet. A much shorter

⁴⁸ The film, titled *Kosmičeski rejs* (some sources say *Kosmičeskoe putešestvie*), exists in two versions, both silent, of 1924 and 1935 respectively. The 1935 version's first frame says "Dedicated to the great scientist and this film's consultant K. E. Tsiolkovsky"; the action takes place in Moscow in 1946, and the chief protagonist is a professor at the K.E. Tsiolkovsky All-Soviet Institute of Interplanetary Relations. Both versions were directed by V.N. Zhuravlev (1904–1987). For a detailed account of it see the web: [Online:] <sensesofcinema.com/2007/cteq/cosmic-voyage> (access 19.05.2017). The film is available on cda.pl/video/5403285b, titled in Polish *Kosmiczny rejs*, 1935 (film niemy), * (access 26.05.2017). This is no place to discuss the early Russian and Soviet space movies, but let us only recall two, *Aelita* of 1924 (silent movie) directed by Yakov Protazanov (1881–1945) and based on the story by Alexei Tolstoy, and *Mežplanetarnaya revolutsiya*, a 1924 cartoon B&W movie with subtitles, directed by Nikolai Xodataev, Zenon Komissarenko and Yuri Merkulov, described as a parody of *Aelita*.

⁴⁹ See A. Kosmodemyansky. *Konstantin Tsiolkovsky...*, p. 14–16 and D.H. Shubin. *Tsiolkovsky, The Cosmic Scientist...*, pp. 40–41. A part of it is available in English, see A.A. Blagonravov (Ed.) *Selected Works...*, pp. 27–40. By "free space" Tsiolkovsky means the gravity-free space.

⁵⁰ Taken from A. Kosmodemyansky. *Konstantin Tsiolkovsky...*, p. 15.

list in English is given by Shubin⁵¹. The TOR list includes dates and references of many kinds, while Shubin only gives dates without explaining whether they are of writing or of first editions. As far as I know, the last printed edition of Tsiolkovsky's philosophic works in Russian was his *Sobrane sočineni v 5 tomax / Collected Works in 5 Volumes* published by the USSR Academy of Sciences in Moscow in 1951–1964 (actually only four volumes were published). It is interesting that the incomplete list of his works given in his biography in Russian-language Wikipedia mentions a text titled *Evangelie ot Kupaly*, reprinted in Moscow in 2003, and a novel *Priklučene Atoma*, reprinted in Moscow in 2009; The first title, not listed in TOR and Shubin, translates as *Gospels of Kupaylo* and hints at Tsiolkovsky's interest in old Slavic faith⁵². The second title appears in Shubin's list as *Adventures of the Atom (1917–1918)*⁵³. It is not listed in TOR.

Rosenthal mentions an edition of Tsiolkovsky's works in 10 volumes that was in preparation by the Russian Academy of Sciences, giving a personal communication of 1992 as her source; three of these volumes were to contain Tsiolkovsky's philosophic, religious, and social writings⁵⁴. However, the up-to-date though partial bibliography in Russian-language Wikipedia does not mention such edition though it lists works as recent as 2009. It seems that TOR, though possibly incomplete, is the only source both comprehensive and easily available.

Reconstruction of Tsiolkovsky's Philosophy on the Basis of Daniel H. Shubin's Work⁵⁵

The recentmost work on Tsiolkovsky in English, Shubin's book consists of five parts:

- I. An introduction and Tsiolkovsky's biography,
- II. Three of Tsiolkovsky's autobiographic sketches of 1919, 1928 and 1935,
- III. Six papers in cosmic philosophy,
- IV. A longer paper on socialist philosophy and human society,
- V. *On the Moon*, a sample of Tsiolkovsky's science-fiction,
- VI. Appendices: a speech by A.R. Belyaev⁵⁶ given in 1940 to commemorate the fifth anniversary of Tsiolkovsky's death, a list of his most important works (English titles only), and a brief bibliography.

⁵¹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist ...*, pp. 341–346.

⁵² *Kupala*, sometimes spelt *Kupaylo*, is believed to have been a pre-Christian Slavic god of fertility.

⁵³ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist ...*, pp. 341.

⁵⁴ G.B. Rosenthal (Ed.). *The Occult...*, p. 197.

⁵⁵ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...* pp. 13–17.

⁵⁶ One of the most famous Russian writers of science-fiction, Alexandr Romanovich Belyaev lived 1884–1942 and was often called „Russia's Jules Verne”. His 1928 novel *Čelovek-Amfibia (The Amphibia Man)* was filmed in 1962 by Vladimir Chebotaryov and Gennadi Kazanski, starring Vladimir Korenev and Anastasia Vertinskaya the daughter of the famous singer Alexandr Vertinsky. The movie was one of the greatest hits of the Soviet cinema and is still easily available on DVD. Its Polish title is *Diabeł morski*.

In Shubin's own words: "The translator feels that the passages selected for the inclusion in this volume are sufficient to provide an excellent survey of Tsiolkovsky's ideology⁵⁷ and only a brief review will be presented here"⁵⁸.

With the help of Shubin's analysis, let us try to present a systematic outline of the principles of Tsiolkovsky's philosophy.

1. The Universe.

The universe is material, it has always existed and will always exist. It cannot be measured and has no beginning and no end. It consists of untold number of what Tsiolkovsky calls Ethereal Islands – galaxies, nebulae, solar systems etc. There are two main forces that keep the universe going, happiness (intangible) and gravity (tangible). Gravity is the source of all the energy that there is in the universe, and the universe generates everything that is. Significantly, he called it "gravity panzer"⁵⁹ and was convinced man can break through it into what he called "free space"⁶⁰, that is space where gravity and air-resistance do not exist. The universe gives all the impression of being an intelligent entity, it clearly has its own will, and it is the will to intellect and happiness, not to error and destruction. Tsiolkovsky says it in so many words: "the entire universe is sensitive, and sensitivity is indivisible from matter"⁶¹. It consistently follows that: "Each atom has the ability to maintain sensation, it is animate. An atom is not just a particle of matter, it is alive"⁶². In fact, the universe is God and God is the universe⁶³. The only possible method to approach the universe is monism, since all is one. In Tsiolkovsky's own words: "We preach monism in the universe, and no more than this. The entire scientific process consists in this drive toward monism, to a wholeness, to an elementary principle. Its success is defined gradually with its attainment of wholeness"⁶⁴. One is reminded here of the famous words from the Emerald Tablet⁶⁵: "As above, so below".

⁵⁷ Some may not like the word "ideology" here. However, the Russian language makes a distinction between "ideologia" or ideology, and "mirovozrenie" that has no equivalent in English but probably derives from the German word "Weltanschauung" that could be approximated in English as "world outlook". Philosophically speaking, "ideologia" is collective, and "mirovozrenie", individual. Compare the Polish words "ideologia" and "światopogląd". "Ideologia" has clear political connotations and its aim is assuming power, while "mirovozrenie" is simply one person's coming to terms with the world and the possibilities of the beyond.

⁵⁸ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 14.

⁵⁹ A. Kosmodemyansky. *Konstantin Tsiolkovsky...*, p. 68.

⁶⁰ Ibidem, p. 64.

⁶¹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 182.

⁶² Ibidem, p. 16.

⁶³ Ibidem, p. 212.

⁶⁴ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 190.

⁶⁵ One of the most important texts of Western alchemy and mysticism, also known as Tabula Smaragdina, attributed to Hermes Trismegistus. One of its translators was Isaac Newton.

2. Life.

As we have seen, each single atom is sensitive and alive. Life fills the universe. Its appearance on various planets is always connected with their individual conditions and distances from their suns. Life is a cyclic phenomenon generated by the universe's force of happiness. Death does not exist, as the elements into which bodies dissolve consist of atoms, and these are alive. The most essential condition for life is heat. When a sun stops generating heat, life in its range comes to an end, and the cycle repeats. Man and higher animals can show their feelings by movement and voice. Lower animals cannot do it, they can only demonstrate will to escape from danger. Plants cannot do even that, but does it mean they have no sensitivity?⁶⁶ "The inorganic world is also powerless to communicate anything about itself but this does not mean that it does not possess a lower form of sensitivity"⁶⁷.

3. Matter.

"The universe is all matter"⁶⁸. There are no spirits or ghosts, but there are beings consisting of matter of low density, of tenuous matter, and these may seem invisible.⁶⁹ All matter is generated by the universe and is essentially one. The organic matter develops from simple to complex, which is the principle of life. However, since atoms are alive and have souls⁷⁰, there is no sense in dividing matter into organic (=living) and inorganic (=not living). The entire universe is alive, only the sensitivity degrees of its various components differ.

4. Man.

The most sensitive being now in existence. Man has developed from monocellular organisms. A distinction has to be pointed out: *man* has developed, but "...the person has changed little himself"⁷¹ and still has animal passions and instincts. Man cannot rationally organize his society, the ants and the bees are far more perfect at it. However, man will continue to evolve, which means both biological changes and a more rational organization of human society in future. Man will tremendously increase in numbers, transform the world and eventually settle both our solar system and other systems in

⁶⁶ The subject of the sensitivity and consciousness of plants is too big to discuss here. For more information about it see: P. Wohlleben. *Das geheime Leben der Bäume*. Munich: Ludvig Verlag, 2016; P. Wohlleben. *The Hidden Life of Trees*. Jackson: Perseus Distribution, 2016; P. Wohlleben. *Sekretne życie drzew*. Kraków: Wydawnictwo Otwarte, 2016; P. Tompkins and C. Bird. *The Secret Life of Plants*. London: Penguin Books, 1974.

⁶⁷ This point has been made in the Jainist philosophy some 25 centuries ago. To the Jains, stones and minerals are "jiva" beings (= beings having souls/consciousness), since they have one sense, the sense of touch.

⁶⁸ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 14.

⁶⁹ The Agni Yoga's main physical principle is the distinction between gross (=dense) and subtle (=fine) matter. We can only see the gross matter, but we can learn to perceive the subtle one as well.

⁷⁰ Tsiolkovsky always uses the expression *atom-dux*, that is *atom-soul/spirit* (G.M. Young. *Russian Cosmists...*, p. 151).

⁷¹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 193.

space. Man should understand the folly of wars, violence and all kinds of oppression and discrimination. Man should not take life⁷².

5. Social organization.

Tsiolkovsky never hides the fact he is a socialist, and his ideas about human society show it clearly. Man is a social being and lives best in a society. The human society evolves into a state that has numerous responsibilities towards its citizens: assuring their basic needs, taking care of the poor, guarantee equal access to education, health care, housing and security of each person. Women and minorities should have the same rights as everyone else. A man's basic right is the right to life and freedom. There should be no death penalty. Laws, not wars, should solve the problems of man. Complete demilitarization is not possible, but the number of weapons can be reduced to the absolute minimum. Everyone has the right to property and the use of it, including the right to land and the use of raw materials found in it. One has also the right to his ideas, inventions and creations.⁷³ People do have rights over animals, but not the right to kill them which "humiliates humanity"⁷⁴. Man has the right to inherit property, but society should see that inheritance does not turn into social parasitism or anything harmful. Paper currency is "twice as bad"⁷⁵ as coins made of gold and other precious metals. Since forging money is easy, money should be abolished and substituted by some better solutions⁷⁶. In the novel "Outside the Earth" Tsiolkovsky describes the world of the year 2017 (sic!), which has a universal government, a universal language and a universal script⁷⁷.

6. Religion.

According to Tsiolkovsky there is no God such as religions – particularly Christianity – talk about. He was ready to accept Jesus Christ as a perfect man, but not God. The only principle here should be religious freedom, not enforcing religion upon people.

⁷² The first promise given by one by one becoming a Buddhist is: "I shall not take life of any sentient being". The Buddha understood it two and a half thousand years ago. True to his principles, Tsiolkovsky was vegetarian.

⁷³ On at least two occasions Tsiolkovsky was a victim of plagiarism, see D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, pp. 51–52 and 81–83. He also experienced the common fate of the pioneers – being disregarded in his own country and having to watch how incompetent foreigners are favoured in the fields in which native sons are pushed aside (A. Kosmodemyansky. *Konstantin Tsiolkovsky...*, pp. 89–90).

⁷⁴ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist ...*, pp. 293.

⁷⁵ *Ibidem*, p. 296.

⁷⁶ *Ibidem*, pp. 271–296.

⁷⁷ The earliest Esperanto societies in Russia were organized in the 1890s (1891 Moscow and Saratov, 1892 Sankt Peterburg, cf. *Enciklopedio de Esperanto*. Budapest: Hungara Esperanto-Asocio, 1979, pp. 589–592), but I could not find any evidence of Tsiolkovsky's interest in Esperanto or of any Esperantists in Kaluga. It is interesting that Tsiolkovsky predicts not only the universal language, but also the universal script; writing in the Russian, ie.modified Cyrillic script, he must have been more aware of the possible advantages of universal script than anyone using only the Latin one, as one writing in English on Russian or Oriental subjects will know all too well.

Tsiolkovsky wrote that “My conclusions are more comforting than the promises of the most optimistic of religions. Not one positivist can be more vigilant than I am. Even Espinoza⁷⁸, in comparison with myself, was a mystic⁷⁹”. As we have already seen, Tsiolkovsky openly declares himself to be both materialist and panpsychist, so the comparison with Spinoza is logical. We have also seen that to Tsiolkovsky, God means the Universe – the living, feeling, all-creating *Vselennaya*⁸⁰. We have already noted he believed his life to be guided by some higher powers⁸¹, but he would probably attribute it to destiny or the higher-developed being, not to a God. As his daughter remembered, Tsiolkovsky did not like the ceremonial side of religion and was not a church-goer, but he believed in the freedom of beliefs, including religion. He considered churches as nice monuments of the past and enjoyed the sound of church bells⁸². He quoted the words of Christ from John 14: 2, “In my Father’s house are many mansions” to support his firm belief in the existence of life throughout the universe, and that planets older than Earth had populations of higher-perfected beings than man. However, as all universe is made of the same elements, this did not disturb his belief in overall Unity⁸³. Again, “As above, so below”.

Tsiolkovsky’s “Science-Fiction” Works

I put the words “science-fiction” in inverted commas because they are really studies in what called “Cosmic Philosophy” by Shubin.

The beginning of Tsiolkovsky’s career as a science-fiction writer was marred by an unfortunate incident. As Shubin narrates it⁸⁴, it was in 1894 that Tsiolkovsky read some of his manuscript works at the house of his Kaluga friend A.N. Goncharov⁸⁵. The readings included *Dreams of Earth and Heaven* and *On the Moon*. Goncharov offered his help in getting the texts published provided they pass the state censorship. When they did, Tsiolkovsky had “Published by A.N. Goncharov” printed on the cover as a surprise gift of gratitude. However, Goncharov got furious that his name was used without permission and in connection with nonsense speculations⁸⁶, and terminated the friendship. What is more, an anonymous review of the book published in 1895

⁷⁸ The original Russian text makes it clear – it is *Spinoza*.

⁷⁹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist ...*, p. 179.

⁸⁰ This is the Russian word for the Universe. Let us note an interesting point: in English, the Universe is an “it”, but in Russian it is a “she”, an all-Embracing Feminine Creative Principle. Small wonder that the Russian philosophy of Nature is one of the richest in the West. This approach reaches its apex with Vernadsky, in whose writings we can see the ideas now known as James Lovelock’s *Gaia Theory* (J. Lovelock. *GAJA. Nowe spojrzenie na życie na Ziemi*. Warszawa: Prószyński i S-ka, 2003.).

⁸¹ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 74.

⁸² As Tsiolkovsky was almost fully deaf, the church bells could be the only musical instrument he could hear and enjoy.

⁸³ D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, pp. 36–37.

⁸⁴ *Ibidem*, pp. 62–64.

⁸⁵ The famous novelist Ivan A. Goncharov (1812–1891) was his uncle.

⁸⁶ The published book contained both science-fiction and some papers in cosmic philosophy.

described it as “intolerable” and pure nonsense, adding that there were many other science-fiction writers with much better scientific background than Tsiolkovsky⁸⁷. This must have hurt Tsiolkovsky very badly. Though he began writing his major novel “*Beyond the Earth*” already in 1896, his next science-fiction work was published only in 1916 (see above).

We have already seen Tsiolkovsky's statement that scientific discoveries are preceded by dreams expressed in science-fiction. It is therefore obvious that his works in science-fiction must reflect his philosophic and academic views. Let us have a look at them from this point of view, our basic text being A. Starchild (Ed.) *The Science Fiction of Konstantin Tsiolkovsky*.

V.1. *On the Moon.*

The book is written in the form of a dream experienced by a man suffering of high fever: he and his friend, a physicist, find themselves on the Moon and explore it, also the dark side. One of the main motives of the story is life in almost gravity-free conditions, exemplified by the problems of boiling water, and another one is the rhythm of sleeping in an environment that is not ruled by the 24-hour cycle. When the heroes eventually run out of food, they fall asleep and the narrator wakes up in a hospital bed on Earth⁸⁸.

V.2. *Dreams of Earth and Sky.*

This book, similar in concept to *Free Space* of 1883, is an outline of cosmology interspaced with stories about space travel and the author's meetings with beings living on different planets and asteroids. Again, we see the motive of freeing oneself from the force of gravity. In Chapter 4, titled *The Gravity Hater* we read the following: “One of my friends was a very odd fellow. He hated terrestrial gravity as though it were something living; he hated it not as a harmful phenomenon, but as his personal, bitterest enemy.”⁸⁹ It is not difficult to recognize it as a humorous self-portrait of the author himself. Much of the scientific part of the book is devoted to the various problems of overcoming gravity and the free space.

V.3. *On Vesta.*

In this brief sketch, Tsiolkovsky describes Vesta as the largest asteroid; in fact, it is the second largest body after Ceres in the asteroid belt. Tsiolkovsky tries to imagine

⁸⁷ Shubin quotes the names of Valentina Nikolaevna Zhuravlyova (1933–2004), and G.S. Altov (the pen name of Henrik Saulovič Altšuller, 1926–1998), but they were much younger than Tsiolkovsky and could not be compared with him in 1894.

⁸⁸ Presentation of a scientific message disguised as a delirious dream of a man with high fever appears also in the Polish novel *Profesor Przedpotopowicz* (1898, new edition 1957) by the biologist and archaeologist Erazm Majewski (1858–1922): E. Majewski. *Profesor Przedpotopowicz*. Warszawa: Czytelnik, 1957.

Tsiolkovsky's descriptions of the lunar landscapes bring to mind another Polish literary work, the first volume of the so-called *Lunar Trilogy* (1903, numerous reprints) by Jerzy Żuławski (1874–1915): J. Żuławski. *Na srebrnym globie, rękopis z Księżycyca*. Kraków: Wydawnictwo Literackie, 1956.

⁸⁹ A. Starchild (Ed.). *The Science Fiction...*, pp. 80–83.

what kind of life might have developed under Vesta conditions and how man could adjust to these conditions. The text gives the impression of being somewhat unfinished, it breaks off without a clear conclusion.

V.4. *Outside the Earth.*

Outside the Earth is one of Tsiolkovsky's best-known science-fiction books, his longest literary work and the only actual novel of his available in English. The story is set in the year 2017 (sic!). As mentioned above, the world has a universal government, a universal international language and a universal script. The story opens in a castle somewhere in the Himalayas where six men retire to give all their time and energy to science⁹⁰. Their names are obvious keys: Newton, Franklin, Galileo, Laplace, Helmholtz. The sixth one, Ivanov, a Russian, is described in the following way: "(He) was a great dreamer, though possessing vast knowledge: more than the others he was capable of abstract thought, and it was he who most frequently broached such unusual subjects as the one discussed by our companions on the day described"⁹¹. The subject in question was the rocket enabling man to reach the Moon, and it is obvious that "Ivanov" is Tsiolkovsky himself. In a few places throughout the long novel (172 pages in English) the author mentions that similar ideas have been suggested by a Russian scientist early in the 20th century, but nobody took them seriously. The description of how only the most beautiful boys and girls are selected for the first generation of space colonists may sound a bit like eugenics, but the author's intentions are honest and sincere. The novel is a veritable paean to the conquest of space and its advantages: broadening knowledge, giving man more space to settle, providing unlimited vegetarian food, making contacts with other intelligent beings possible; it almost seems that it is a *belles lettres* counterpart of Tsiolkovsky's more academic paper described below. The novel's underlying motives are at least two, the familiar question of freeing man from the force of gravity and the advantages of international cooperation and interdisciplinary approach to the conquest of space. In this approach, philosophy is just as important as engineering solutions. Let us have a closer look at the five great scholars and the way Tsiolkovsky describes them⁹²:

Galileo Galilei (1564–1642) is an astronomer and a connoisseur of fine arts;

Isaac Newton (1643–1727) is presented as a philosopher and profound thinker, phlegmatic by nature;

Benjamin Franklin (1706–1790) is a practical mind with religious inclination;

Pierre Laplace (1749–1827) wants to appear only as a mathematician, but deep inside he is also a philosopher and a poet;

Hermann von Helmholtz (1821–1894) is a genius in physics, though absent-minded and forgetful as a person.

It almost seems as if Tsiolkovsky wanted to stress that even the greatest scientists were just human beings with their own peculiarities.

⁹⁰ The Himalayan setting may be an echo of Helene Blavatsky's writings; the Mahatmas, Blavatsky's chief sources and teachers, are described by her as living in the Himalayas.

⁹¹ A. Starchild (Ed.). *The Science Fiction...*, p. 168.

⁹² *Ibidem*

V.5. *The Aims of Astronautics.*

This work is more of a scientific paper than science-fiction, but as we have already seen, it is not easy to make a clear distinction between the two when studying Tsiolkovsky's writings. The initial question is simple and direct: "What will humanity gain from conquering outer space?"⁹³. The first achievement will be the very journey into outer space (=conquering gravity) and utilization of solar energy. Settling other planets comes second, but to survive on them man will need very special dwellings, suits and the overall adjustment to gravity-free environment. Tsiolkovsky gives some space to the discussion of beneficial or harmful effects of living in gravity-free worlds depending on the individual persons involved, the constructions of greenhouses to cultivate food, and the recirculation of water and human excreta. But even if there are advantages of man's spreading into space, why should we do it? Tsiolkovsky gives the answer at the very end of the paper. There are two dangers, remote but real, that threaten our planet, its explosion "from an accumulation of elastic material inside it and the cooling down and extinction of the Sun"⁹⁴, not to mention the problems caused by overpopulation.

V.6. *Changes in Relative Weight.*

Starchild tells us that the text is excerpted from the original manuscript⁹⁵. The main topic is given by the title of the work: what would the familiar concept of physical weight be on different planets? The passages available in English discuss this question in the contexts of Mercury, Mars, Vesta (with which Tsiolkovsky seems to have had some special fascination), Ceres and Pallas⁹⁶, and the rings of Pallas. In a manner reminiscent of Emanuel Swedenborg and his book *De Telluribus in Mundo nostro Solari, Quae vocantur Planetæ: et De Telluribus in Cælo Artificiose: Deque illarum Incolis; tum de Spiritibus & Angelis ibi; Ex Auditibus & Visis* (1758)⁹⁷ and Johannes Kepler's *Somnium, seu opus posthumus de astronomia lunari* (1634)⁹⁸, Tsiolkovsky introduces the Mercurians, Martians, Vestians, and Pallasians as his interlocutors and sources of information⁹⁹. Again, we see the familiar motive of overcoming the force of gravity and

⁹³ Ibidem, p. 333.

⁹⁴ Ibidem, p. 372.

⁹⁵ Ibidem, p. 373.

⁹⁶ Two of the three largest asteroids in the asteroid belt.

⁹⁷ E. Swedenborg. *De Telluribus in Mundo Nostro Solari, Quae vocantur Planetæ: Et De Telluribus in Cælo Astrifero: Deque illarum Incolis: tum de Spiritibus & Angelis ibi; Ex Auditibus & Visis*. London: The Swedenborg Society, 1934; E. Swedenborg. *Earths in the Universe. Earths in our Solar System which are called Planets, and Earths in the Starry Heaven, Their Inhabitants, and the Spirits and Angels There. From Things Seen and Heard*. London: The Swedenborg Society, 1970.

⁹⁸ J. Kepler. *Sen czyli wydane pośmiertnie dzieło poświęcone astronomii księżycowej*. The Polish translation by Dorota Sutkowska and Jarosław Włodarczyk. Warsaw: Wydawnictwo Naukowe Scholar, 2004.

⁹⁹ As the text says, *Ceres was at the opposite end of the orbit, and I would have had to go nearly 1.000 million kilometers out of my way to visit it.* (A. Starchild (Ed.). *The Science Fiction...*, p. 388). He introduced the Vestians in text V.3, but in a speculative manner, without directly talking to them.

the advantages of it, and of the variety of life in space depending on the environment. Tsiolkovsky says that Pallas has rings, but the modern observations do not confirm it.

V.7. *Living Beings in the Cosmos.*

This paper could possibly be of much interest to the SETI Program¹⁰⁰. Again, it is more an academic paper than a science-fiction text. The text opens with a question: “Why are animals made up of only 29 elements, 9 of them probably unnecessary, out of 90¹⁰¹?¹⁰²” The soils and atmospheres of other planets may have different chemical composition, but this does not mean there is no life there, only that life has to adjust to the environment. Most forms of life need solar energy, but even where the sun cooled down, life might have survived. How important is the size of the brain? If the larger the brain, the greater its powers, obviously human heads ought to grow in size, but there are three problems involved. *First*, larger head means difficulty at birth, which might lead to abandoning procreation. *Second*, such a development might lead to overall pessimism and early deaths. *Third*, the brain and the mind are not in equilibrium right now (written in 1929, PK), but once this equilibrium is attained, man will stop thinking there is some conflict between his duties to himself and to his children. The size of living organisms is limited by the force of gravity, so theoretically planets of weaker gravity might support living beings of enormous size. Tsiolkovsky gives much space to the process of respiration. Human respiration system, in his view, is imperfect, because one of its openings is also serving as the intaking of food, while a proper system should have two openings only for itself. Are water and air absolutely necessary in the quantities we use? Those living in high altitudes have to do with less oxygen, but they adapt and survive. Could we imagine an organism sustaining only on light energy? It is difficult but not impossible. Life is periodic in character, it develops and evolves in stages, and this is the general rule valid all across the universe, with each planetary environment developing it in its own way.

V.8. *Biology of Dwarfs and Giants.*

This paper discusses the differences in life processes in men of unusual sizes. Tsiolkovsky assumes that the average height of man is ca. 180 cm, so he discusses two opposite cases, the dwarfs (men of 90 cm in height) and the giants (men of 360 cm in height). The half-sized man will have fewer problems with gravity than the double-sized one. Could we imagine a man one hundred times smaller, that is being only some 10 millimeters? His strength in relation to his body will be a hundred times greater than ours, and he will have no problems with gravity. Man developed the current size only because the larger is stronger. However, as we shall expand into space, we should not be surprised to meet intelligent beings of enormous sizes.

¹⁰⁰ SETI = Search for Extraterrestrial Intelligence, a large international project started in 1959.

¹⁰¹ As of 2017, there are 118 elements in the Mendeleev Periodic Table.

¹⁰² A. Starchild (Ed.). *The Science Fiction...*, p. 401.

V.9. *Island of Ether.*

The title “Island of Ether” is the Universe as we now know it¹⁰³, and this paper is really a summary of Tsiolkovsky's cosmology, the origin and development of solar systems, the development of suns and other stars¹⁰⁴, the various types of suns and their planetary systems, and finally the structure of the Milky Way and the distribution of its known elements. The conclusion of the paper stresses that our solar system, including planet Earth, the Milky Way, and even the Island of Ether, are but infinitely small parts of the giant Whole.

V.10. *Beyond the Earth's Atmosphere.*

The main points discussed in his paper are jet propulsion, gravity, and gas pressure. Gravity is beneficial to plants (destroying mouldering trunks, bending branches with fruits and controlling the height reached by sap), and it does not disturb any basic human functions. However, a living body cannot manage without the gas pressure exercised upon it, and this would be impossible in free space. Man can emerge into it in protective clothing (space suit, PK), but his sensory perception will be very different: no up or down, no atmosphere obstructing long-distance sight, the overall illusion of nearness. The paper concludes with some practical remarks on the construction of jet-propelled aircraft and its three rudders – of direction, altitude and stabilization.

As we can see, there are a few basic motives which reappear in Tsiolkovsky's writings again and again: the problem of overcoming gravity, the possibilities of life in free space, the unity of life and the Universe, the advantages of and respect for science, finally stressing the importance of philosophy and science-fiction in solving problems that seem to be merely technical or engineering ones. Being self-taught, Tsiolkovsky was not limited by any academic dogmas that decide what is an “acceptable” science and what is not. Tsiolkovsky's approach is closer to the Renaissance model of an all-round scientist/philosopher¹⁰⁵ than to his and our time's idolizing ever-narrowing fields, which results, as the English say, in not seeing the wood for the trees. The concept of Unity, stressed by Tsiolkovsky again and again, demands versatility, and both Tsiolkovsky and Roerich showed that it is possible.

Conclusions

Tsiolkovsky's non-rocketry writings are closer to the speculations of modern cosmology or broadly understood futuristics/probabilistics than to science fiction, though it might be classified as philosophical science fiction, a genre that is easier to recognize than to define. To him, science fiction was the first step to solving actual scientific problems, giving the advantage of unlimited imagination. His philosophy belongs to the Russian Cosmism, but has its roots in the holistic thinking of the classical philoso-

¹⁰³ A. Starchild (Ed.). *The Science Fiction...*, p. 428.

¹⁰⁴ Tsiolkovsky puts suns in a special category which includes our own Sol.

¹⁰⁵ Of course, in today's terms, where philosophy is generally seen as something different from science.

phy of India. Many of his ideas seem close to Theosophy, and it is possible that he was not aware of how much he was influenced by the Indian philosophy.

He knows the classical concepts of science fiction – see *Outside the Earth*, which is written in the tradition of Jules Verne – but he prefers to elaborate his ideas in a scholarly way, sometimes interspersing them with more literary embellishments (like in *Dreams of Earth and Sky*). He claims to be a materialist first and last, but he is ready to define the universe as God and attribute intelligence and sensitivity to it. He feels his life to be preordained, but attributes it to higher intelligences of free space, not to any God. He stresses the fact that the universe is full of life, which puts him in the line started by Giordano Bruno in his *De l'infinito universe et mundi*¹⁰⁶ (1584) and continued by Emanuel Swedenborg in his *De Infinito, et Causa Finali Creationis*¹⁰⁷ (1734) and the book referred to in part V.6. above.

At the same time he says that even Spinoza was a mystic in comparison with him, which stresses his strictly scientific points of departure; indeed, his philosophic papers are rather considerations built upon well-known facts than exercises in pure fantasy, as Tsiolkovsky stresses again and again that his points of departure are facts, not guesses. This places him outside the field of science-fiction as the term is generally interpreted. The contemporary works by scholars who wrote science-fiction - Isaac Asimov, Lloyd Biggle jr., Arthur C. Clarke, Stephen Baxter, Michael Crichton, Kim Stanley Robinson, A.E. Van Vogt¹⁰⁸ – are traditional novels rather than philosophic treatises. Just as the philosophers of ancient India, Tsiolkovsky stresses that we are but a speck of dust in an unimaginably giant Whole and affected by whatever happens in it; this line of thought was continued by Daniil Andreev, whom we have mentioned above, and by Lev Gumilow (1912–1992), whose *Etnogenez i biosfera Zemli*¹⁰⁹ (1979) and *Etnosfera, istoria lyudei i istoria prirody*¹¹⁰ (1993) frequently remind the reader of Tsiolkovsky and the other Cosmists. There are so many parallels between the thinking of Tsiolkovsky and Vernadsky¹¹¹ that discussing them would make this paper twice as long.

In more ways than one, Tsiolkovsky brings to mind Nicholas and Helena Roerich and the *Agni Yoga* system¹¹². There are many parallels – the unity of the universe and

¹⁰⁶ *On the Infinite Universe and Worlds*. I base my knowledge of this book on the Russian translation titled *O beskonečnosti, vselennoi i mirax*, see: Dzhordano Bruno. *Izbrannoe*. Samara: Izdatel'skii dom "Agni", 2000, pp. 323–480.

¹⁰⁷ E. Swedenborg. *Prodromus Philosophiæ Ratiocinantis de Infinito, et Causa Finali Creationis*. Place not given, Palala Press, 2015; E. Swedenborg. *The Infinite. The Final Cause of Creation*. London: The Swedenborg Society, 1965.

¹⁰⁸ Although A.E. Van Vogt (1912–2000) was not a scholar in terms of academic degrees, he had an incredible gift of turning scientific theories into novels. His *Voyage of the Space Beagle* (1950, based on Oswald Spengler's *Untergang des Abendlandes* theories of cyclic history) and *Null-A Trilogy* (1948–1984, based on Alfred Korzybski's *Science and Sanity* and principles of general semantics) are exemplary philosophical science fiction masterpieces.

¹⁰⁹ L. Gumilev. *Etnogenez i biosfera Zemli*. Moskva: Izdatel'stvo ACT, 2005. Available in the English translation: L. Gumilev. *Ethnogenesis and the Biosphere*. Moscow: Progress Publishers, 1990.

¹¹⁰ L. Gumilev. *Etnosfera: istoria lyudei i istoria prirody*. Moskva: Izdatel'stvo ACT, 2006.

¹¹¹ See bibliography; Vernadsky, Levit, Bailes, Lovelock, Young.

¹¹² On Nicholas Roerich and the *Agni Yoga* see: M. Gdok-Klafkowska. *The Dream of Kanchenjonga*:

its being full of life, variety as the key to stability and survival, periodic character of life and its evolution, infinity as a sensitive and conscious being, adaptability, necessity of matching the technological development with the mental and ethical one, equality of all forms of life, spirituality rather than religion and the equal status of all religions, freedom of thinking, necessity of knowing tradition, finally the versatility and the return to the Renaissance model of a scholar/philosopher making no qualitative distinction between a mathematical work and a philosophic study, a poem or a science-fiction novel. It is not known whether Tsiolkovsky and Roerich ever met, but it seems almost impossible that Tsiolkovsky did not know about Roerich and his art, though he could not know the Agni Yoga¹¹³.

Regarding the possible influence of Theosophy on Tsiolkovsky's views, there is no doubt it exists, but its detailed study necessitates being well-acquainted with all the works by both Helena Blavatsky and Tsiolkovsky, a giant though extremely tempting challenge. This would also include answering the question whether those views of Tsiolkovsky's that seem Indian are Indian indeed, or they are filtered through Theosophy.

Let me conclude this paper with what is probably the most-quoted one-liner by Tsiolkovsky: *Planeta est' kolybel' razuma, no nel'za žit' v kolybeli*¹¹⁴ This literally means *The planet is the cradle of mind, but one cannot live in a cradle*. However, it most frequently appears in English in a slightly different version that I think Tsiolkovsky would accept: "The Earth is the cradle of humanity, but one cannot live in a cradle forever"¹¹⁵.

I feel tempted to add: may man grow up in his cradle to be another perfect creature of the Universe. In Tsiolkovsky's own words: *Vsya vseennaya polna žizni soveršennyx suščestv, kotoraya ožidatet i Zemlu, i drugie nemnogie planet nezrelogo vozrosta.*¹¹⁶

The Roerich Family and Himalayan Studies. [In:] *Buddhist Himalaya, Studies in Religion, History and Culture.* Vol. 1: *Tibet and the Himalaya.* Ed. by A. McKay and A. Balikci-Denjongpa. Gangtok: Namgyal Institute of Tibetology, 2011, pp. 318–319; M. Gdok-Klařkowska. *Mikołaj Konstantynowicz Roerich jako prekursor komunikacji międzykulturowej...*, pp. 50–52; M. Gdok-Klařkowska. *Agni Joga jako płaszczyna dialogu między Wschodem a Zachodem...*, pp. 79–83.

¹¹³ The first volume of the Agni Yoga – *Leaves of Morya's Garden.* Vol. 1: *The Call* – appeared in Russian in Paris in 1923, and in English in New York in 1924.

¹¹⁴ This quote reputedly comes from a letter written by Tsiolkovsky in 1911; no source at my disposal says to whom was the letter addressed. It seems this quote is so much taken for granted that nobody bothers about the details of its source and context.

¹¹⁵ In A. Kosmodemyansky. *Konstantin Tsiolkovsky...*, p. 95 it appears in a slightly different wording: *This planet is the cradle of the human mind, but one cannot spend all one's life in a cradle.*

¹¹⁶ *Naučnaya etika / The Scientific Ethic* (1930), p. 24 of the original edition available on TOR (access 3.06.2017). it translates: *The entire universe is full of life of perfect beings, which fate also awaits the Earth and a few other planets of immature age.* D.H. Shubin. *Tsiolkovsky. The Cosmic Scientist...*, p. 252 translates it somewhat clumsily as: *The entire universe is full of the life of perfected creatures, and which the Earth is awaiting and so are few other planets that have not reached mature growth.* That which the Earth is awaiting is, of course, the fullness of life of its perfect beings. The untranslatable aspect of this statement is that both *vseennaya* (=the universe) and *žizn* (=life) are feminine in Russian, while in English they are just "it", neuter. This gives it an emotional coloring English is wholly incapable of reproducing.

Let us only hope that man matures – *eventually* – and becomes such a perfect being as Tsiolkovsky dreamt about. It is a small consolation, but a consolation all the same, that we are not the only immature ones.

Bibliography

1. Russian philosophy and science.

- Agni Joga, *učenie živoi etiki*. 2 vols. Moskva: Eksmo, 2003. [This is the most complete Russian edition of the Agni Yoga system, also called Living Ethics, that we owe to the Roerichs.]
- Andreev D.L. *Roza Mira*. Moskva: Mir Uranii, 2000. [Contains a glossary and an index of names.]
- Andreev D.L. *The Rose of the World*. Lindisfarne Books, 1997. [Incomplete: only Books I-VI of the original twelve. Contains a glossary and an index.]
- Andreev D.L. *Roza Mira, die Weltrose*. 3 volumes. Vega e.K., 2008–2009. [An excellent complete translation with helpful glossaries and indices.]
- Andreeva A.K. et al. *Daniil Andreev v kul'ture XX veka*. Moskva: Mir Uranii, 2000. [An interesting collection of studies by several Russian scholars edited by Andreev's widow.]
- Andreeva A.K. *Plavanè k nebesnoi Rossii*. Moskva: Agraf, 2004. [Written by D.L. Andreev's widow, this book is both an autobiography, a biography of Andreev's, and an introduction to his philosophy and works.]
- Bailes K.E. *Science and Russian Culture in an Age of Revolutions*. Vol. 1: *Vladimir I. Vernadsky and His Scientific School, 1863–1945*. Bloomington: Indiana University Press, 1990.
- Carlson M. *No Religion Higher Than Truth. A History of the Theosophical Movement in Russia, 1875–1922*. Princeton: Princeton Legacy Library, 1993.
- Berdyayev N.A. *Theosophy and Anthroposophy in Russia*. [Online:] <http://www.berdyayev.com/berdiayev/berd_lib/1916_256.html> (access 20.04.2017).
- Decter J. *Nicholas Roerich. The Life and Art of a Russian Master*. Vermont: Park Street Press, 1989.
- Dębowski J. *Przyroda w filozofii rosyjskiego prawosławia*. Olsztyn: Wyższa Szkoła Pedagogiczna, 1998.
- Dubaev M. *Rerich*. Moscow: Molodaya Gvardia, 2003.
- Gdok-Klafkowska M., P. Klafkowski. *Myśl o przyrodzie w filozofii rosyjskiej. Szkice do portretu*. [In:] *Ekorozwój i Agenda 21: Interdyscyplinarny model kształcenia*, pp. 135–146. Ed. by P. Pieczyński. Szczecin: Collegium Balticum, 2007.
- Goerdts W. *Historia filozofii rosyjskiej*. Kraków: Wydawnictwo WAM, 2012.
- Klafkowski P. *Czy ludzkość ma jeszcze szansę? Konstanty Ciołkowski, Mikołaj Roerich i Daniil Andreev*. [In:] *Dialog kultur i społeczeństw*. Ed. by B. Afeltowicz, J. Miturska-Bojanowska, H. Walter. Szczecin: Volumina pl, 2016, pp. 83–92.
- Levit G.S. *Biochemistry-Biosphere-Noosphere. The Growth of the Theoretical System of Vladimir Vernadsky*. Berlin: WVB Verlag, 2001.
- Łoski M. *Historia filozofii rosyjskiej*. Kęty: Antyk, 2000.
- Pisareva E.F. *The Light of the Russian Soul: A Personal Memoir of Early Russian Theosophy*. Wheaton: Quest Books, 2008.
- Rosenthal Glatzer B. (Ed.) *The Occult in Russian and Soviet Culture*. Ithaca and London: Cornell University Press, 1997.
- Rottert T.G., I.V. Lipskaya (Ed.). *Vystavka proizvedenii xudožnikov grupy AMARAVELLA, katalog*. Meždunarodnyi Centr-Muzei imeni N.K. Rerixa, Moskva 2000. [This is the catalogue of the exhibition of the Amaravella Group paintings held in Moscow in 2000, and the best source of information about the history and members of the group.]
- Špidlik T. *Myśl rosyjska, inna wizja człowieka*. Warszawa: Wydawnictwo Księży Marianów, 2000.

- Stołowicz L. *Historia filozofii rosyjskiej, podręcznik*. Gdańsk: Słowo. Obraz/Terytoria, 2008.
- Ul'rix I.V. *Žizn' čeloveka, Vvedenie v Metaistoriu*. Moskva: Izdatel'stvo „Litan”, 2003. [This book is essentially a commentary on D.L. Andreev's *Roza Mira*.]
- Vernadsky V.I. *The Biosphere*. Göttingen: Copernicus Publications, 2013.
- Vernadsky V.I. *Geochemistry and the Biosphere*. Santa Fe: Synergetic Press, 2007.
- Walicki A. *Zarys myśli rosyjskiej od Oświecenia do Renesansu religijno-filozoficznego*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego, 2005.
- Waldenfels E. von. *Nikolai Roerich Kunst, Macht und Okkultismus*. Berlin: Osburg Verlag, 2011.
- Val'denfels E. von. *Nikolai Rerix Iskusstvo, Vlast', Okkultizm*. Moscow: Novoe Literaturnoe Obozrenie, 2015.
- Young G.M. *Nikolai Fedorov, an Introduction*. Balmont: Nordland Publishers, 1979.
- Young G.M. *Russian Cosmists, the Esoteric Futurism of Nikolai Fedorov and his Followers*. Oxford: Oxford University Press, 2012.
- Young G.M. *Navigating Spaceship Earth: Four Russian Cosmists*. Quest Magazine. Summer Issue. Wheaton, 2013, pp. 105–108, 120.

2. Works by and about Konstantin E. Tsiolkovsky.

a/ Printed books.

- Blagonravov A.A. (Ed.). *Selected Works of Konstantin E. Tsiolkovsky*. Honolulu: University Press of the Pacific, 2004.
- Ciołkowski K. *Poza Ziemią*. Warsaw: Iskry, 1979.
- Kosmodemyansky A. *Konstantin Tsiolkovsky, His Life and Work*. Honolulu: University Press of the Pacific, 2000.
- Shubin D.H. *Tsiolkovsky. The Cosmic Scientist and His Cosmic Philosophy*. Publisher and place not given. ISBN 978-1-365-25981-4, copyright 2016.
- Starchild A. (Ed.). *The Science Fiction of Konstantin Tsiolkovsky*. Honolulu: University Press of the Pacific, 1979.

b/ Tsiolkovsky's works online (access 1.06.2017).

In Russian: <tsiolkovsky.org/ru/nauchnoe-nasledie>

In English: <tsiolkovsky.org/en/cosmic-philosophy-by-tsiolkovsky>

[This is an almost complete collection of Tsiolkovsky's philosophic and literary works. The Russian page gives complete texts. The English page, much smaller, gives summarizing translations of selected texts. The portal is in constant development.]

Other.

- Bruno Dž. *Izbrannoe*. Samara: Izdatel'skii dom "Agni", 2000.
- Dante A. *Le Opere di Dante*. A cura di M. Barbi et al. Firenze: Testo Critico della Societa Dantesca Italiana, Bemporad et Figlio- Editori, MCMXXI.
- Enciklopedio de Esperanto*. Budapest: Hungara Esperanto-Asocio, 1979.
- Gdok-Klafkowska M. *The Dream of Kanchenjonga: The Roerich Family and Himalayan Studies*. [In:] *Buddhist Himalaya. Studies in Religion, History and Culture*. Vol. 1: *Tibet and the Himalaya*. Ed. by A. McKay and A. Balikci-Denjongpa. Gangtok: Namgyal Institute of Tibetology, 2011.
- Gdok-Klafkowska M. *Mikołaj Konstantynowicz Rerich jako prekursor komunikacji międzykulturowej*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve meždukul'turnyx kommunikatsii*. Ed. by K. Janaszek, J. Miturska-Bojanowska, R. Gawarkiewicz. Szczecin: Grafform, 2012, pp. 50–52.
- Gdok-Klafkowska M. *Agni Joga jako płaszczyzna dialogu między Wschodem a Zachodem*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve meždukul'turnyx kommunikatsii*. Ed. by K. Janaszek, J. Miturska-Bojanowska, A. Šunkov, B. Rodzevič. Szczecin: Grafform, 2012, pp. 79–83.

- Golovačev V. *Spasiteli Veera*. One-volume edition. Moskva: Eksmo, 2004.
- Gołowaczew W. *Wirus mroku* (cykl *Obrońcy wachlarza*, tom 1) i *Wysłannik* (cykl *Obrońcy wachlarza*, tom 2). Olsztyn: Solaris, 2005. [The third volume of the Polish translation has not been published.]
- Grojs B. *Russkii kosmizm, antologia*. Moskva: Ad Marginem Press, 2015.
- Gumilev L. *Ethnogenesis and the Biosphere*. Moscow: Progress Publishers, 1990.
- Gumilev L. *Etnogenez i biosfera Zemli*. Moskva: Izdatel'stvo ACT, 2005.
- Gumilev L. *Etnosfera, istoria lyudei i istoria prirody*. Moskva: Izdatel'stvo ACT, 2006.
- Kepler J. *Sen czyli wydane pośmiertnie dzieło poświęcone astronomii księżycowej*. Warszawa: Wydawnictwo Naukowe Scholar, 2004. [The Polish translation by Dorota Sutkowska and Jarosław Włodarczyk.]
- Klafkowski P. *Od kultur do metakultury, refleksje nad dziełem Daniła Andrejewa „Roza Mira”*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve međukul'turnyx kommunikatsii*. Ed. by K. Janaszek, J. Miturska-Bojanowska, R. Gawarkiewicz. Szczecin 2012: Grafform, pp.74–79.
- Klafkowski P. *Opisując nieopisywalne: Światy i zaświaty Daniła Andrejewa*. [In:] *Homo Communicans*. Vol. 2: *Čelovek v prostranstve međukul'turnyx kommunikatsii*. Ed. by K. Janaszek, J. Miturska-Bojanowska, R. Gawarkiewicz. Szczecin 2012: Grafform, 2012, pp. 122–132.
- Launius R.D., J. Logsdon, Robert W. Smith. *Reconsidering Sputnik: Forty Years Since the Soviet Satellite*. London: Routledge, 2000.
- Lovelock J. *GAJA. Nowe spojrzenie na życie na Ziemi*. Warszawa: Prószyński i S-ka, 2003.
- Majewski E. *Profesor Przedpotopowicz*. Warszawa: Czytelnik, 1957.
- Semenova S.G., A.G. Gačeva (Ed.). *Russkij komizm, antologia filofsokoi mysli*. Moskva: Pedagogika-pres, 1993.
- Swedenborg E. *De Telluribus in Mundo Nostro Solari, Quæ vocantur Planetæ: Et De Telluribus in Cælo Astrifero: Deque illarum Incolis: tum de Spiritibus & Angelis ibi; Ex Auditis & Visis*. London: The Swedenborg Society, 1934.
- Swedenborg E. *Earths in the Universe. Earths in our Solar System which are called Planets, and Earths in the Starry Heaven, Their Inhabitants, and the Spirits and Angels There. From Things Seen and Heard*. London: The Swedenborg Society, 1970.
- Swedenborg E. *De Cælo et Ejus Mirabilibus et de Inferno ex Auditis et Visis*. Whitefish: Kessinger Publications, 2009.
- Swedenborg E. *Heaven and its Wonders, and Hell from Things Seen and Heard*. London: The Swedenborg Society, 1958.
- Swedenborg E. *Prodromus Philosophiæ Ratiocinantis de Infinito, et Causa Finali Creationis*. Place not given. Palala Press, 2015.
- Swedenborg E. *The Infinite, The Final Cause of Creation*. London: The Swedenborg Society, 1965.
- Tompkins P., C. Bird. *The Secret Life of Plants*. London: Penguin Books, 1974.
- Wohlleben P. *Das geheime Leben der Bäume*. Munich: Ludvig Verlag, 2016.
- Wohlleben P. *The Hidden Life of Trees*. Jackson: Perseus Distribution, 2016.
- Wohlleben P. *Sekretne życie drzew*. Kraków: Wydawnictwo Otwarte, 2016.
- Żuławski J. *Na srebrnym globie, rękopis z Księżyca*. Kraków: Wydawnictwo Literackie, 1956.