A Philosophical Discourse of the Earth

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The authors examined a philosophical discourse of the Earth in the New History. The purpose of the study is to prove the practical importance of the philosophical discourse of the Earth for advancing human civilization. The nature of philosophy means the transformation of the discourse and the way of human life in accordance with the intelligible complexity of the Earth and the Universe. A holistic view of the Earth and the Universe is used by humans in the proclaimed cultural ideal, with the help of which they achieve the ordering (harmonization) of their way of life with the laws of the Earth and the Universe. The authors identified and considered three stages of a holistic view of the process of transforming the Earth and the Universe: (1) The concept of the biosphere and noosphere by Vladimir Vernadsky; (2) the Gaia hypothesis by James Lovelock; and (3) the "Evolving matter" theory by Oleg Bazaluk. The use of knowledge about the nature of the Earth and the Universe transformation determines human activities and the limits of an individual's self-actualization. Essentially, a philosophical discourse of the Earth focuses on the practice of human transformation of the Earth and the nearby space.

Keywords: philosophical discourse, Vladimir Vernadsky, James Lovelock, Oleg Bazaluk, biosphere, "Evolving matter" theory, Gaia hypothesis, practice,

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Introduction

In 1676, the book *A philosophical discourse of Earth relating to the culture and improvement of it for vegetation, and the propagation of plants, &c. as it was presented to the Royal Society* was published by John Evelyn in London (Evelyn, 1676). The published study is remarkable due to the fact that it reveals a new human approach to understanding the Earth as a material object. In the New History, researchers have ceased to consider the Earth as an object that reproduces the material and energy resources necessary for human existence. Researchers began to recommend transforming the Earth to meet the human needs. It was not enough for a human that the Earth as a material object reproduced by itself. Therefore, Evelyn, who held a number of responsible administrative positions at the court of Charles II, suggested that the government encouraged landowners to plant special types of trees suitable for building the English fleet. Evelyn's research focused on purposeful transforming the natural landscape to meet the current challenges facing the government of England (Evelyn, 1676).

However, why did a civil servant at the court of King of Scotland, England and Ireland wrote about "philosophical discourse of earth", and not, for example, about "the practice of transforming the Earth?" What is the connection between the ideas of "transforming the Earth" and "philosophical discourse"?

The questions posed turn us to the study of the nature of philosophy. The main goal of the proposed study is to prove the practical significance of a philosophical discourse of the Earth for advancing human civilization.

Philosophy as a way of life

Contemporaries distinguish between philosophy and science, preferring the latter. It is believed that the transformations of the Earth and society are promoted exclusively by scientific disciplines, and the technologies that are transforming the Earth and society are only scientific. Moreover, philosophy was divided into analytic and continental, and the main reason for the division was explained by the attitude of philosophers to scientific methods of knowledge. The style and clarity of presentation of analytic philosophy were declared as "close to science"; therefore, it is promoted as more pragmatic and relevant to society than continental philosophy (Chase & Reynolds, 2011).

However, Maximilian Noichl has proved that the division of philosophy into analytic and continental is not supported by the structure of the philosophical publications (Noichl, 2021). Large scale analysis of the citation-structure of philosophy as a discipline, carried out on the basis of 68,152 records downloaded from the Reuters Web of Science-Database, led to the following findings (Noichl, 2021):

1. "We do not find a cluster for analytic philosophy, which is coherent with claims about its heterogeneous structure…"
2. "…we see that there is indeed such a thing as Continental philosophy." "Continental philosophy emerges as a separable entity in the literature, which nonetheless has multiple links to the rest of philosophy, specifically to the cluster that has been termed Philosophy of Society and Justice (22), and to the large clusters of philosophy of biology (25), which on closer inspection seems to include a lot of general history and philosophy of science."
3. "Seen as a whole, Continental philosophy seems to be well integrated into practical philosophy."

The results obtained by Noichl indicate the stereotypical understanding of philosophy that has developed in modern society. Analysis of statistical results once again confirms that philosophy does not need to prove its "practicality" and "scientific nature." Philosophy was created by Plato as a special practice, and it has remained the same throughout its history.

At the end of the twentieth century, Gregory Vlastos first used the methods of modern analytical philosophy for the analysis of classical philosophy. The research results allowed Vlastos to argue the following fact: "The ancient Greeks invented the notion of cosmos, which is presupposed by the idea of a science of nature and by its practice. This idea implies that the regularities in nature cannot be challenged by the intervention of divinities either in the world or in humankind" (Vlastos, 2005: xix). The ancient Greeks realized that everything happening on the Earth was determined by the laws of nature and human intervention. This understanding took on a complete form in the dialogue of Plato, who developed philosophy as a special discourse and a way of life (Hadot, 1995; Sellars, 2017; Bazaluk, 2021).

In the chapter that gave rise to the title of the book, Pierre Hadot wrote that in antiquity "philosophy was a way of life," "mode of existing-in-the-world, which had to be practiced at each instant, and the goal of which was to transform the whole of the individual's life" (Hadot, 1995: 265). Philosophy "does not merely cause us to know: it makes us 'be' in a different way" (Hadot, 1995: 265). During the Middle Ages, theology did temporarily deprive philosophy of practice (Hadot, 1995). However, this temporary and violent act was in no way related to the nature of philosophy.

The nature of philosophy is a discourse and a way of life that causes disclosure (aletheia) of a phenomenon or a process, thanks to which human masters that power that lies at its basis. Phronesis (practical wisdom) allowed an individual to transform their own presence on the Earth in accordance with the intelligible (revealed) laws of the cosmos (Bazaluk, 2021). Plato developed dialectics, or, equivalently, philosophical discourse, as a way of revealing the laws of nature that ordered the existence of outer space, the Earth, a nation-state, and human.

The beginning of a philosophical discourse of the Earth can be definitely dated to the Timaeus dialogue, written by Plato around 360 BC (Plato, 2020). Timaeus dialogue, first of all, demonstrates the possibilities of philosophical discourse to reveal the nature of the Universe, the Earth, and the human in order to use the results obtained in practice, to order human life in accordance with the intelligible cosmos (Bazaluk, 2021).

Consequently, the attempts to divide philosophy into analytic and continental, guided but its motivation and attitude to practice, are meaningless. They are not in line with the nature of philosophy. The motivation and focus on practice were laid down by Plato at the heart of philosophy. John Sellars, studying this issue came to the following conclusion: "Philosophy as a Way of Life is a model of philosophy that emphasizes its practical, life-changing aspects. It cuts across the division between analytic and continental philosophy, neither aligned with nor opposed to either tradition" (Sellars, 2017: 55).

Therefore, "A philosophical discourse of earth" by John Evelyn is the philosophy of the Earth. Following the traditions laid down by Plato in the Academy, we understand "a philosophical discourse of the Earth" as a way to reveal the complexity of the transformations taking place on the scale of the Earth as a separate space object. Philosophy of the Earth is the comprehension of measuring the complexity of the Earth's existence and the definition of the laws that cause changes on the scale of the Earth and the Universe.

In the New History, comprehension of the complexity of existence of the Earth as a space object has gone through three stages:

1. The concept of biosphere and noosphere by Vladimir Vernadsky.
2. The Gaia hypothesis by James Lovelock.

3. The "Evolving matter" theory by Oleg Bazaluk.

Consider the highlighted stages.

Vladimir Vernadsky: Philosophical Thoughts of a Naturalist

Vladimir Vernadsky was the first to deepen the idea of the biosphere to the definition widely recognized by the modern scientific community (Vernadsky, 1975; 1977; 1978; 1987) and to initiate the scientific substantiation of the noosphere concept suggested by Pierre Teilhard de Chardin (Vernadsky, 1987; Teilhard de Chardin, 1987). Vernadsky's ideas have been repeatedly interpreted and reinterpreted throughout the rich heritage of his students and followers. The development of Vladimir Vernadsky's ideas about the biosphere and noosphere are worth attention in the studies by Vitaliy Kordjum (1982), Vlail Kaznacheev (1989), Vladimir Levchenko (2003), etc.

Academician Vernadsky was one of the first scholars to realize that oxygen, nitrogen and carbon dioxide in the Earth's atmosphere are the result of biological processes. During the 1920s, Vernadsky published his research showing that living organisms transform the planet just like any physical force. "Living organisms are a function of the biosphere and are closely connected materially and energetically with it; they are a huge geological force that determines it. In order to be convinced of this, living organisms must be manifested as something whole and inseparable." Thus, the manifested organisms represent the Living Substance, i.e., an aggregate of all living organisms currently existing, numerically expressed in elementary chemical composition, weight, and energy. It is connected with the environment by the biogenic current of atoms: its respiration, nutrition and reproduction. The apparent phenomena of life are studied in biogeochemistry and are manifested as a huge geological process, a geological force of the planetary nature. The main defining principle for them is the astronomical position of the planet – its distance from the Sun and the inclination of its axis to the ecliptic. The indicated astronomical elements of the Earth determine the climate, and the climate determines the life that covers our planet. An annual cycle – a complete revolution of the Earth around the Sun – is not only a measure of our (and geological time), but also a natural measure of the life cycle on the planet. A life cycle is associated with the circulation of chemical elements, creating, as we see it, the Earth's atmosphere (troposphere), continuously and consistently releasing gases created due to life processes – O_2, N_2, CO_2, H_2O, etc." (Vernadsky, 1987: 45-46).[1]

[1] «Живые организмы являются функцией биосферы и теснейшим образом материально и энергетически с ней связаны, являются огромной геологической силой, ее определяющей. Для того чтобы в этом убедиться, мы должны выразить живые организмы как нечто целое и единое. Так выраженные организмы представляют живое вещество, т.е. совокупность всех живых организмов, в данный момент существующих, численно выраженное в элементарном химическом составе, в весе, в энергии. Оно связано с окружающей средой биогенным током атомов: своим дыханием, питанием и размножением. Так выраженные явления жизни изучаются в биогеохимии и выявляются как огромный геологический процесс, геологическая сила планетного характера. Основным определяющим началом для них является астрономическое положение планеты – расстояние ее от Солнца и наклон ее оси к эклиптике… Указанные астрономические элементы Земли определяют климат, а климат определяет жизнь, покрывающую нашу планету. Годовой цикл – полный оборот Земли вокруг Солнца – не только является мерилом нашего (и геологического) времени, но и выявляется естественным мерилом цикла жизни на планете. Цикл жизни связан с круговоротом химических элементов, создающим, как увидим, земную атмосферу (тропосферу), непрерывно закономерно выделяющих в нее жизненными процессами газы – O_2, N_2, CO_2, H_2O и т.д.».

In the works of Vernadsky, life acquires a strictly scientific context – the doctrine of Living Substance. "In geology, life manifests itself only in the form of Living Substance. It is necessary to take this into account in precise scientific geological work. In religious, philosophical, and even in everyday language, the concepts – life and Living Substance – do not coincide, sometimes dramatically. We do not take this into account and in geology, we talk about the Living Substance in the understanding that is given here" (Vernadsky, 1987: 52-53).[2]

Vernadsky presented the existence of the Earth as the evolution of the geosphere and biosphere. The highest stage of the latter was the noosphere. The emergence of each new sphere of the Earth's existence (in Vernadsky's terminology – the state of matter) transforms the previous complexity of being. The Living Substance, as a planetary phenomenon, transforms the Earth's geosphere and creates a biosphere on its basis: "we can even at present definitely assert that Living Substance in the biosphere plays the main active role and, in terms of its power, cannot even be compared with anything, with any geological force, in its intensity and continuity in time. In fact, it defines all the basic chemical laws in the biosphere" (Vernadsky, 1987: 220).[3] The Living Substance as a planetary force was considered by Vernadsky as a "real space-time," which differs from the inert matter by at least twelve meaningful differences (Vernadsky, 1977). The Living Substance transforms the Earth with the biogeochemical functions: "They are the result of the natural manifestation of billions of living indivisibles, which are revealed taken together in certain chemical processes. Such functions can be divided into five groups: 1) gas functions; 2) concentration functions; 3) redox functions; 4) biochemical functions, and 5) human biogeochemical functions – Homo Sapiens. Taken together, they determine the main chemical manifestations of Living Substance in the biosphere" (Vernadsky, 1987: 222).[4]

According to Vernadsky, the emergence of humans on the Earth and their activities transform the biosphere into the noosphere. "The noosphere is a new geological phenomenon on our planet. In it, for the first time, humans become the largest geological force. They must and can rebuild the area of their life with their work and thought, rebuild it in a radical way in comparison with what was before" (Vernadsky, 1987: 303).[5] The civilized world forms a thin planetary shell of intelligent organisms and their sphere of activity – the noosphere. The noosphere was a historical epoch in the annals of the Earth's crust.

[2] «В геологии жизнь проявляется только в виде живого вещества. Необходимо в точной научной геологической работе с этим считаться. В религиозном, философском и даже в обыденном языке понятия – жизнь и живое вещество – не совпадают, иногда резко. С этим мы не будем считаться и в геологии будем говорить только о живом веществе в том понимании, которое здесь дано».

[3] «…мы можем уже в настоящее время определенно утверждать, что живое вещество в биосфере играет основную активную роль и по своей мощности ни с чем, ни с какой геологической силой не может даже быть сравниваемо по своей интенсивности и непрерывности во времени. В сущности, оно определяет все основные химические закономерности в биосфере».

[4] «Они являются результатом закономерного проявления миллиардов живых неделимых, выявляющихся взятых в совокупности в определенных химических процессах. Такие функции могут быть разделены на пять групп: 1) газовые функции; 2) концентрационные функции; 3) окислительно-восстановительные функции; 4) биохимические функции и 5) биогеохимические функции человека – Homo Sapiens. Вместе взятые они определяют основные химические проявления живого вещества в биосфере»

[5] «Ноосфера есть новое геологическое явление на нашей планете. В ней впервые человек становится крупнейшей геологической силой. Он должен и может перестраивать своим трудом и мыслью область своей жизни, перестраивать коренным образом по сравнению с тем, что было раньше».

The noosphere closely interacts with the biosphere and geosphere, transforming them with its activity. The emergence of humans and their activities have changed the cycles of matter, energy and information on the Earth's scale. The appearance of Living Substance radically changed the Earth's geosphere. The emergence of human cognition radically changed the biosphere and the appearance of the planet created by it (Vernadsky, 1977; 1978; 1987).

Vernadsky organized research on the nature of the Earth and its laws in two large research teams, at the origins of the organization of which he stood: The Biogeochemical Laboratory (now, V. Vernadsky Institute of Geochemistry and Analytical Chemistry of the Russian Academy of Sciences) and the Radium Institute, the organizer and the director of which Vernadsky was from 1922 to 1939.

Currently, Vernadsky's research is considered pioneering, laying the foundation for environmental sciences. However, at one time, Vernadsky's ideas about the biosphere and noosphere were not widely disseminated outside the Soviet Union.

James Lovelock: The Gaia hypothesis

The Gaia hypothesis was introduced in the 1970s by chemist James Lovelock and the microbiologist Lynn Margulis. The original idea suggested that near-homeostatic conditions on the Earth have been maintained "by and for the biosphere," however, the authors did not provide calculations of the biogeochemical cycles (Visconti, 2021). The Gaia hypothesis reveals the features of the interaction of living organisms with their inorganic environment on the Earth in order to form a synergistic and self-regulating complex system. Lovelock presented the existence of the Earth as a physical and chemical environment including the biosphere, the atmosphere, the hydrospheres, and the pedosphere, which, through a cybernetic feedback system, is unconsciously controlled by the biota. Biota independently regulates the planetary environment in order to achieve stabilization of habitability conditions in full homeostasis. Planetary homeostasis is supported exclusively by living forms, which even determine human development. An important aspect of the hypothesis was the proposal to detect the combinations of chemicals, including oxygen and methane, in the atmospheres of other planets. It was indeed a relatively reliable and cheap way of detecting life on space objects (Lovelock, 2010).

The initial version of the Gaia hypothesis was not completely different from the idea of the biosphere, claimed by Vernadsky almost 50 years earlier. However, at the same time, (a) Lovelock's substantiation was less convincing than that of Vernadsky. (b) The presented hypothesis was focused on the study of the activity of Living Substance only (in Vernadsky's terminology).

The Gaia hypothesis was inconclusive because Lovelock was a Doctor of Medicine and worked in rodent cryonics. While Vernadsky's scientific interests initially covered mineralogy, crystallography, geochemistry, geology, soil science, radiogeology, biology, and biochemistry.

The Gaia hypothesis, in its original form, contradicted the principles of natural selection and proved to be theological (Visconti, 2021). However, Lovelock was an inventor throughout his life, and his work in NASA's planetary exploration programs expanded his circle of interests and acquaintances. Lovelock developed many scientific instruments, including the invention of a family of ionization detectors for gas chromatography, used, among other things, to study the planetary atmospheres. Lovelock's inventions and collaborations with researchers from other fields helped bring the Gaia hypothesis into line with Earth system science, biogeochemistry and systems ecology.

A series of the held Gaia conferences (1st – August 1985 at University of Massachusetts Amherst; 2d – San Diego, California on March 7, 1988; 3d – Valencia, Spain, on June 23, 2000; 4th – October 2006 at the George Mason University) contributed to the popularization of the Gaia hypothesis and its refinement. However, the final verdict of the Gaia hypothesis came from a large-scale study by Toby Tyrrell (2013). Summarizing nearly 50 years of pros and cons of the Gaia hypothesis, Tyrrell arguably rejected a homeostatic mechanism, which Lovelock claimed to be his main discovery. Tyrrell confirmed close links between the evolution of life and the environment and the fact that biology affects the physical and chemical environment. However, he pointed out that it was useless to use the term "Gaia" in relation to these phenomena. Both phenomena are already accepted and explained by the processes of natural selection and adaptation (Tyrrell, 2013).

Thus, the Gaia hypothesis is a dead end (Tyrrell, 2013: 209). The complexity of the Earth's existence was not completely presented in the hypothesis and proved to be contradictory. Nevertheless, the Gaia hypothesis has fulfilled its mission. It revived the interest of researchers in the works of Vernadsky and stimulated many new ideas about the nature of the Earth and the process of its transformation. The holistic approach to the study of the Earth proposed by Vernadsky was established in the academic environment and was implemented in the "Evolving matter" theory.

The "Evolving matter" theory

The "Evolving matter" theory was suggested by Oleg Bazaluk in 2000. The theory substantiation has repeatedly been complicated. The latter line of reasoning was presented by Bazaluk in 2016 in the book *The Theory of Evolution: From a Space Vacuum to Neural Ensembles and Moving Forward* (Bazaluk, 2016). The main difference of the "Evolving matter" theory from the two previous views on the complexity of the Earth's existence is the use of a new analysis method called Big data (Reca, 2020). In fact, the key mission of the "Evolving matter" theory is, in a certain way, to systematize knowledge from various fields of science, which, to a greater or lesser extent, affects the issues of disclosing and revealing the nature of transformations of the Earth and the Universe. The "Evolving matter" theory is featured by: (1) the amount of data (Volume); (2) data update rate (Velocity); (3) heterogeneous data types (Variety); (4) data compliance with the disclosed nature (Veracity); and (5) the significance of data (Value). Moreover, Bazaluk stipulates that the systematization of knowledge about the complexity of the Earth's existence suggested by him is nothing more than an improved Vernadsky model (Bazaluk, 2016). As a result, the "Evolving matter" theory is perceived as a rethinking of Vernadsky's ideas about the biosphere and noosphere using new approaches and methods of working with the global data volume.

Using the predictive analytics methods allowed Bazaluk to obtain the following results. "On the example of the Solar System, only one sequence of the complication of the structure of the Universe can be seen: Inert Matter → Living Matter → Intelligent Matter, or alternatively, taking into account "transition" states of matter: Inert Matter → Bioinert Matter → Living Matter → BioIntelligent Matter → Intelligent Matter. Modern understanding of the complication of these states of matter is considered in the Big Bang theory, the synthetic theory of evolution, and the concepts of noogenesis" (Bazaluk, 2016: 129-130).

A holistic comprehension of the Earth's nature is presented in the theory as a complexity of interactions between the three states of matter. Each state of matter is studied by scientific disciplines that use appropriate methods and tools of cognition. The novelty of the "Evolving matter" theory is that:

1. The theory allows us to consider the transformation of the Earth as a process. It is built in accordance with the requirements of the process philosophy (Seibt, 2021). Therefore it is not tied to a specific system of views, for example, to the modern understanding of the Big Bang theory or the synthetic theory of evolution. The theory predicts the disclosure of a new complexity of understanding of the Universe, biological life and human, but at the same time, it claims only to systematize the results of this disclosure itself. The disclosure process is carried out within the specialized scientific disciplines that use the predictive potential of the "Evolving matter" theory and improve it with new knowledge in their fields.
2. Bazaluk presented human activity as a new state of matter, which arose on the basis of living matter (in Vernadsky's terminology). Here are his brief conclusions: "In the Solar System, the states of matter have been formed sequentially, at intervals of approximately 3 billion years: (a) Approximately 6 (5.5) billion years ago, in the Milky Way Galaxy, the Solar System was formed – one more hotbed in uneven, continuous and non-linear block complication of the Universe. (…) (b) Approximately 3.5 billion years ago, as a result of geological evolution, on the Earth, the first biological organisms emerged and gained a foothold. Over 3 billion years, they formed the system of Living Matter, which was denoted by the term "biosphere." (c) Approximately 6-7 million years ago, as a result of neuroevolution, on the basis of the highly developed biosphere of Earth, the first structures of Intelligent Matter emerged. This started the formation of the noosphere" (Bazaluk, 2016: 130).

Thus, the "Evolving matter" theory offers an improved way to systematize knowledge about the existence of the Earth, based on the ideas of Vernadsky and the development of the process philosophy and Big data.

Conclusions

The results of comprehending the complexity of the Earth as a space object are used in philosophy to create a cultural ideal (Bazaluk, 2019). The cultural ideal is developed and promoted by philosophy as a way of ordering (harmonizing) the laws of organizing human life, the Earth and the Universe. The cultural ideal draws humans to their own nature in order to transform their way of life in accordance with it. The cultural ideal promotes the intelligible unity of human nature, the Earth and the Universe and focuses human attention on the need to transform their being in accordance with the intelligible complexity of the Earth and the Universe. In fact, the cultural ideal sets the focus and limits of human self-actualization.

Thus, it has been found that a philosophical discourse of the Earth performs two main functions:

1. Reveals the complexity of the existence of the Earth as a space object.
2. The obtained results are concentrated in the cultural ideal, and are used to transform the individual and collective way of human life in accordance with the disclosed complexity of the outer space.

The modern philosophical discourse of the Earth allows drawing the following conclusions:

1. The complexity of the Earth's existence is understood by the modern academic community as the co-evolution of three states of matter: Inert Matter, Living Matter and Intelligent Matter (in Bazaluk's terminology). Each state of matter creates its own sphere of existence, the mission of which is to transform in such a way as to resist any transformations from competing spheres. For example, the noosphere is a self-sufficient sphere of human existence. However, it is forced to continuously transform (become more complex) in order to withstand the pressure from the constantly increasing geosphere and biosphere.
2. The revealed complexity of the Earth's existence in concentrated in the cultural ideal. Bazaluk termed it with the metaphor "Earth Transforming" (Bazaluk, 2019). The "Earth Transforming" ideal defines the focus and limits of human self-actualization, namely, it reveals human as a planetary force, about which Vernadsky wrote back in 1944 (Vernadsky, 1987).
3. The processes of natural selection and adaptation explain the features of transforming human activities and continuous complication of the global ecosystem of the Earth and local ecosystems.

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