The Birth of Life out of the Spirit of Soviet Science, or the Case of Ol'ga Lepeshinskaia

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Between 1950 and 1955 Ol'ga Lepeshinskaia's (1871-1963) discovery of "living matter"—non-cellular matter capable of material exchange and development—was considered one of the most significant achievements of Soviet scholarship, although it was later regarded as pseudo-science and came to serve as an obvious illustration of the absurdity of Stalinist research. This dramatic change in the official reception of the theory seems less paradoxical if one understands Soviet culture as an artistic project, looking at science, as Frederic Nietzsche urged, "from the point of view of the artist" and at art "from the point of view of life" (Nietzsche 50). From this "point of view," one can speak not of moral value, but of aesthetic value, which lies beyond the various abstractions encountered in the field of scientific discourse.

Most of the work that addresses the discovery of Lepeshinskaia's "living matter" is constructed around the examination of two opposing groups of Soviet sciolists: adherents to the ideas of scientist Trofim Lysenko (1898-1976), whom Lepeshinskaia joined, and the Soviet geneticists, who were exposed to persecution by the State.[1] Treating the vast expanse of the question of "origins," these works examine the historical texture of this debate, although they do not reveal the reasons why Stalinist power supported Lysenko while repressing the geneticists, merely explaining this as the arbitrariness of a totalitarian regime. In recent years, several works have appeared that examine the biological, literary, and linguistic facets of Soviet science as fixed ideological intentions.[2] From this point of view, the *lzheotkrytiia*, or false-discoveries, of Soviet science between 1920 and 1950 are reflections of general cultural processes and can be viewed according to fixed logic. It is also worth mentioning the recent book by Evgenii Dobrenko, *Politekonomiia sotsrealizma* [The Political Economy of Socialist Realism], where an entire paragraph is devoted to Lepeshinskaia's "living matter." Understanding "living matter" as "a certain shapeless substance, as an 'essence' without a form" (134), Dobrenko investi-

gates the transition of this concept "from the revolutionary romanticism of Gor'kii—through Lepeshinskaia's 'overcoming of formalism'—to the most radical form of socialist-realist political-aesthetic fantasizing" (142)—that is, to the scientist Lysenko. No less fruitful is a different approach—an analysis of the scientist Lepeshinskaia in the context of Soviet culture's process of self-definition as it strove to find its place in history.

Understanding culture as an artistic work presumes the co-authorship of its leaders, in which the magnitude of one's contribution depends on the extent to which he is engaged in achieving a shared goal. The artist, taking upon himself the production and presentation of the cultural project, becomes similar to the fairy tale hero, as in Nietzsche's expression that the artist is able to "turn his eyes and look at himself," stepping forward at the same time as an object and a subject, and as a poet, an actor, and a viewer (75-76). The producers of Soviet culture, understanding it as something novel, actively attempted to define it in history and demonstrate the regularity and finality of its existence. In this respect, the sphere of cultural utterances became an area of the natural sciences, like biology, advancing in the study of one of the most significant questions of the period—the problem of the origin of life. This gave culture the possibility not only to demonstrate its findings, but to construct itself as a science that was simultaneously a text and a meta-text. It is possible to see the resemblance of such an understanding of science in the avant-garde theory of *ostranenie* (defamiliarization), or *obnazhenie priema* (the baring of the device). This approach allows one to understand why scientists like Vladimir Vernadskii (1863-1945) and Aleksandr Oparin (1894-1980) were not considered examples of the highest forms of progress, although they were recognized by Soviet culture. In examining the pseudo-scientific theories of Maksim Gor'kii (1868-1936) and Ol'ga Lepeshinskaia, it is possible to see how culture formed and changed its own presentation of its position in metaphysical history and space.

The characteristic aspiration of Stalinist culture—the state's mobilization of all its resources for the creation of its products—is fully visible in the case of Lepeshinskaia, where the borders between the materially existing individual and the form of the Soviet scientist were almost completely erased. All that is known of her life comes from either her own texts or words, where her path in life is presented as one long preparation for her discovery of "living matter."[3]

Lepeshinskaia, née Ol'ga Protopopova, was born in Perm into a family of well-known manufacturers, and after graduating from high school she moved to St. Petersburg to continue her education. In the capital, she was captivated by revolutionary ideas and, marrying Panteleimon Lepeshinskii, a friend to and brother-in-arms with Lenin, took an active role in the organization of the revolution. This split her life into two stages. After the political revolution, dreaming of a scientific career at the age of fifty, Lepeshinskaia directed all her energy toward the area of natural sciences. Her colleagues' active aversion to her ideas only added fuel to the fire of her revolutionary heart. The famous VASKhNIL sessions (1948), where Lysenko's work was officially declared valid and genetic research was forbidden, allowed for the possibility, and for the subsequent recognition, of Lepeshinskaia's scientific ideas. An understanding of the reasons behind the wide-spread acknowledgement of "living matter" within Soviet culture, however, seems impossible without examining the theories of two recognized Soviet scientists: Vladimir Vernadskii and Aleksandr Oparin.

The Appearance of Living Matter

The revolution of 1917 forced Vernadskii to abandon Petrograd and move to Ukraine, where he succeeded in organizing the Ukrainian Academy. In the Crimea in the beginning of 1920 the scientist fell ill with typhus, which almost ended his life. In his journals he tells of his experiences in a state of delirium between life and death. It was, as he writes: "интенсивное переживание мыслью и духом чего-то чуждого окружающему, далекого от происходящего" (*Dnevniki*).[4] The possibilities of his future passed before his eyes. In these visions, he saw that his most important task was to organize an Institute of Living Matter before the end of his earthly existence—somewhere between the ages of eighty-three and eighty-five, as he foresaw in his hallucinations.[5] And indeed, several of the visions Vernadskii had in the Crimea came true: in 1927 he organized the Department of Living Matter within the Academy of Sciences of the Soviet Union, and in 1929 this department was renamed the Biogeochemical Laboratory (BIOGEL), which Vernadskii headed until his death at the age of eighty-two.

Although the term "living matter" itself might be familiar to the Russian-language reader from A. Ia. Danilevskii's "Zhivoe veshchestvo" [Living Matter] (1896), or from French embryologist and

philosopher Félix Le Dantec's "La matiere vivante" [Living Matter] (1898), the Russian translation of which was published in the same year, precedence is given to Vernadskii and his conception of this scientific revelation. In Leningrad, during the noteworthy year of 1926, Vernadskii published *Biosfera* [The Biosphere], a short but significant work in which he details at length his conception of "living matter." In the ideas of this book it is possible to see the reflection of overarching cultural tendencies of the period, particularly the juxtaposition of the "formal" and "organic" paradigms. Boris Gasparov rightly notes the parallelism between two phenomena of 1930s Soviet culture—between Mikhail Bakhtin and Trofim Lysenko. Both thinkers worked within the organic paradigm, which explains their connection with the "Bergsonian" structure of thought, and which can be viewed as an alternative to the "mechanical" approach (Gasparov 452). In the case of Henri Bergson's influence on Vernadskii, it is possible to speak of a more direct, and even of a more "pure," influence.

The central idea of Vernadskii's book is the idea of the necessity of the conception of the biosphere, or the sphere of biological life. The biosphere, as he views it, forms "a united whole" with the planet's "outer region"—the earth's crust (*Biosfera* 3). Thus, in speaking of the biosphere, Vernadskii combines all living matter into one "super object" for the purpose of examining the biosphere "v kosmicheskoi istorii" (in cosmic history) (*Biosfera* 14). Later, in "Nauchnaia mysl' kak planetarnoe iavlenia" [Scientific Thought as Planetary Phenomena], written in 1938 and unpublished during the life of the author, Vernadskii speaks directly of this "super object": "Каждый живой организм *в биосфере*—природный объект—есть живое природное тело. *Живое вещество биосферы есть совокупность живых организмов, в ней живущих*" (emphasis added) (15).[6] Defining "living matter," Vernadskii confirms that this concept "precisely and completely encompasses the objects of study in biology and biochemistry" (15). He emphasizes the simplicity and clarity of "living matter": "Оно *простое, ясное* и никаких недоразумений вызвать не может. Мы изучаем в науке только живой организм и его совокупности. Научно они *идентичны* понятию жизни" (emphasis added) ("Nauchnaia mysl'" 15).[7]

Vernadskii places the earth's biosphere in cosmic space, as it directly influences all living beings and, furthermore, controls and gives life: "Космические излучения, идущие от всех небесных тел, охватывают биосферу, проникают всю ее и все в ней" (*Biosfera*

14).[8] "*Вещество биосферы* … проникнуто энергией; *оно становится активным*, собирает и распределяет в биосфере энергию, превращает ее в конце концов в энергию в земной среде свободную, способную производить работу" (emphasis added) (*Biosfera* 9).[9]

This conception of cosmic history allows one to see the biosphere not only in terms of the relationship between the past and the present, but in terms of the relationship between the present and the future. Because Vernadskii leaves questions concerning the origins of life unexamined, finding that "living matter always has its origins in the living" (*Biosfera* 24), it is possible to see an echo of the avant-garde project regarding the new beginning of history. Furthermore, Vernadskii fuses the future with the scientific idea of mankind. A scientific thought that initially operates in the biosphere will eventually move to the noosphere (the sphere of human thought), embracing it "geologically" with the intellect. For Vernadskii, the move from the biosphere to the noosphere is part of the necessary progression of cosmic history and the evolutionary goal of the biosphere. He writes of the noosphere: "впервые человек становится крупнейшей *геологической силой*. Он может и должен перестраивать своим трудом и мыслью область своей жизни, перестраивать коренным образом по сравнению с тем, что было раньше" ("Nauchnaia mysl'" 15).[10]

The primary pursuit of Oparin's work, Vernadskii's main opponent on the question of the birth of life on the planet, was not the question of the historical process of the future, but evidence of the connection between the past and the present. Two years before the release of *Biosfera*, Oparin published *Proiskhozhdenie zarozhdenii zhizni na Zemle* [The Origin of Life on the Earth] (1924), in which he elaborated on the theory of the origins of life from inanimate nature (abiogenesis). For Oparin, all of history has already occurred and, thus, it is possible only to imagine it. His main task was, as he put it, "the study of the *logical* evolution of matter that, *at some point*, led to the beginning of life on earth" (emphasis added) (*Proiskhozhdenie* 325). According to Oparin, the origin of life is the result of chaos' ordering of itself. From the open world—the world as an open system—arises the integrated world: a system, which is capable "not only of self-preservation, but of increasing its mass at the expense of the matter of the surrounding external environment (of growth)" (331). From the moment of its fusing, inanimate matter is subjugated to "principally

new regularities"—to the law of life. The system is completed and perfected, therefore the repetition of the beginning of life is not possible: "Жизнь в настоящее время не возникает, потому что она уже возникла" (life does not originate nowadays because it already originated). (*Proiskhozhdenie* 24). History for Oparin, thus, ended at the point where, for Vernadskii, it was just beginning.

Oparin, as one might say, appears to be a conservative, as he is satisfied with positing biological life as a final goal. Vernadskii's views on the evolutionary progression of cosmic history, however, are more consistent with Soviet culture. This might explain the fact that Vernadskii received the Stalin prize, while Oparin did not. Yet, the Soviet project could not imagine itself without a past: its revolutionary present is both the past and the future in its development.

At the end of 1926, in his work on writer M. M. Prishvin (1873-1954) in the journal *Krasnoi nov'*, Maksim Gor'kii reacted enthusiastically to the ideas of Vernadskii. Although for Vernadskii, as for Oparin, history obtains a new quality once completed, for Gor'kii, this very same history lasts from the past to the present (Oparin) and from the present to the future (Vernadskii)—a continuity that leads to the unity of these differing periods. The secrets of the cosmos, as Gor'kii saw it, were not as interesting and important as the following riddle:

> каким чудом неорганическое вещество превращается в живое, а живое, развившись до человека, дает нам Ломоносовых и Пушкиных, Менделеевых и Толстых, Пастера, Маркони и сотни великих мыслителей, поэтов – работников по созданию второй природы, творимой нашей человеческой мыслью, нашей волею. (Gor'kii 267)[11]

Gor'kii was convinced that history does not end with the birth of life, but that life must be ready for "incest" with its "Great Mother" and, with her, give birth to a second nature—to culture. "Have I come to the point of incest?"—questioned Gor'kii. And he answered himself: "Но ведь это так: рожденный Землею человек оплодотворяет ее своим трудом и обогащает красотою воображения своего" (267).[12] The past and the future, thus, unite in an act of violence—in revolution. If for Vernadskii, the noosphere completes the biosphere, than for Gor'kii, the noosphere recasts the biosphere. If for Vernadskii, the creator is of some transcendental quality, than for Gor'kii, the creator must be the offspring of human nature itself.

From this comes the appeal, or even demand, for science to "create living matter in a glass test-tube!"—words Gor'kii placed in the mouth of the scientist P.F. Protassov in his 1905 play *Deti solntsa.* [Children of the Sun] (225).

Living Matter and the Glass Test-tube

In 1926, when Vernadskii published *Biosfera* and Gor'kii was dreaming of an anthropomorphic creator, professional revolutionary turned scientist Ol'ga Lepeshinskaia published her first book in the provincial town of Vologda: *Voinstvuiushchii vitalism: o knige prof. Guvicha* [Militant Vitalism: about the book of Professor Gurvich]. In this small monograph her basic claims, which would be raised against Soviet genetics in 1948, were already well-defined. Lepeshinskaia details two forms of material—what she called "dead matter" and "living matter"—in which the differences of these forms are so vast and fundamental that she claims they demand special methods of study. In particular, she notes that "the method of studying quantitative modifications in the area of chemical reactions that determine the conditions of the so-called 'dead matter'," is insufficient with regard to "the study of the new quality of material (albuminous material), which is characterized by the word 'life'" (*Voinstvuiushchii vitalizm* 17). For Lepeshinskaia, it is possible to consider the objects of inanimate nature from the point of view of a positivist cognitive strategy: that is, through abstraction and analysis. Thus, the objects of inanimate nature are perceived as static—seized from the sensible world—while analysis is understood as dismemberment and decomposition, in complete correspondence with the predicate "dead." In this situation, any synthesis reduces to the "simple, arithmetical sum of chemical elements" (18).

The new qualitative state of matter, called the "albuminous body" by Lepeshinskaia in 1926, has the capability of self-organization. The scientist observes that, like from the sex cell, "living matter" passes through different stages of development, growing and developing into an adult organism (*Voinstvuiushchii vitalizm* 59). This living material is not only able to absorb other objects, but can include these objects into the organization of its own body, realizing, in this sense, its development: that is, it is capable of the realization of absolute synthesis. It is evident that the new culture of the period was striving namely toward this kind of synthesis—one in which *size* is conditioned upon the assumption of the other into itself as a necessary part of its function. This new culture evidently wanted to model

itself according to the concept of vital dynamics. This seems to be, thus, one of the main reasons behind the following statement by Vladimir Papernyi: "в культуре 2 'живое' постоянно употребляется с положительным знаком и противопоставляется при этом 'механическому' предыдущей культуры" (158).[13]

Nevertheless, in the face of all the differences of "living material"—of the allotted quality of life from death—Lepishinskaia believed it impossible to adhere to the persuasions of the Vitalists: that is, "to assume, as a basis, a quality that is some kind of non-material substance, not unlike 'vital power'" (*Voinstvuiushchii vitalizm* 18). In essence, it seems that this statement contains the incriminating pathos of her brochure. A bit later, the *Kratkii filosofskii slovar'* [Concise Philosophical Dictionary] (1940) would express a bolder claim to the Vitalists:

> Виталисты утверждают, что жизненные явления отделены абсолютной пропастью от неорганической природы, ибо являются следствием целесообразно направленных сверхматериальных (супранатуральных) сил, подчиняющих себе все физико-химические процессы в живых существах. (2 ed. 31)[14]

It is interesting to note that the assertion of an "absolute precipice" existing between living things and inorganic nature, exposed as the primary shortcoming on the part of Vitalism, is only a consequence. The main mistake of the Vitalists, in the opinion of "culture" (and here we can speak specifically about the opinion of culture, as under this name a number of dictionaries have been written, the articles of which lack individual authorship), consists in the statement regarding the transcendence of a prescribed goal. For the Vitalists, as in the case of Vernadskii, who, incidentally, was reproached for precisely this, organic material fulfills a prescribed function that exists somewhere "beyond," while man is only a means to the end. With this approach, the surrounding environment stands out only insofar as it supplies the conditions for the realization of the goal. It is worth noting that the main idea of Lysenko's pseudo-scientific theory lies precisely in the necessity that creative rights be transferred from the transcendental object to the builders of communism. In the question of "the goal," Vitalism is contrasted with Darwinism on the "rational expediency of the organic world" (*Kratkii* 3 ed. 98). The contents of this instruction is uncovered in the third edition of the *Kratkii filosofskii*

slovar' (1952), which elucidates that the "rationalization" of expediency consists in the correlation of "construction" and the legacy of the "living bodies" with the goals of the Soviet State. Thus, the State is an active "surrounding sphere" that can adjust the metabolic state of the living body and, in this way, bring nature in conformity with itself.

The conception of living matter was not assembled by Lepeshinskaia at once, in accordance with a statement made by her in 1933 (although it is unlikely that she was an objective witness to her own work). The very thought of living matter was connected with the controversial contemporary argument over the understanding of cellular theory.[15] Lepeshinskaia's position in this polemic, however, was met with harsh criticism from the scientific community, although this criticism only fortified Lepeshinskaia in her self-assurance and the scientist-revolutionary became even more active in her chosen field.

Initially, everything seemed to be straightforward. Lepeshinskaia saw a key difference between inanimate and living nature in the organization of material. However, similar to Oparin, Lepeshinskaia did not plan to extend her analysis of the process of abiogenesis into the historical dimension. Rather, for Lepeshinskaia, it was not the vertical (historical) perspective that was more important, but the horizontal (spatial) extension. Thus, in solving the problem of abiogenesis, Lepeshinskaia tried to find a mediator—something that, in its organization, was more complex than inorganic material, but still not as complex as the organization of matter. "Living matter" became this mediator. Introducing the concept of "living matter," Lepeshinskaia solved, first and foremost, the problem of the origin of cells. According to her logic, if a cell can originate only from a cell, then it is necessary to suppose that "at some point, in a very distant time, at the dawn of life, in some way the very first cell originated. By means of mechanical division this cell produced a multitude of cells" (*Kletka* 15). However, Lepeshinskaia claims that any small element of living matter possesses the capability to pass on inherited traits: that is, life begins not from cells, but from "a simpler constitutions—from non-cellular living matter" (18). Thus, Lepeshinskaia defines "living matter" as "matter that does not possess the forms of cells—that is, non-cellular matter in which there are albuminous bodies, and which is capable of material exchange and, consequently, of development (*Proiskhozhdenie kletok* 14).

By introducing the concept of "living matter," however, Lepeshinskaia did not quite solve the problem of abiogenesis, which

united her, to some extent, with the Vitalists. Her notion of history, in actuality, did not allow her to cross that border to where there would not be life: "Нет сомнения, что в очень отдаленные времена жизнь находилась на той начальной ступени развития, на которой еще не было клеток, а существовало лишь неклеточное живое вещество …" (*Kletka* 29).[16] In opposition to Gor'kii, Lepeshinskaia was not aspiring to understand how Lomonosovs and Pushkins arose from inorganic matter, although in her laboratory one could find a large number of test tubes with living matter. Lepeshinskaia did that which Vernadskii could not do: she made living matter tangible. Lepeshinskaia compressed history into the space of her laboratory: after all, as she saw it, the living matter of "a very distant time," and of 1930s Moscow, in their essences, were completely identical.

Lepeshinskaia was certain that all living things must necessarily be examined in the context of their dependence on the surrounding environment, and living matter was not an exception. Falling into "bad conditions," living matter might perish, while in the face of favorable conditions it begins to grow—developing into a cell or, rather ominously, cultivating "an entire blood islet" (*Kletka* 16). Considering that living matter requires nourishment from the environment in order to *grow*, Lepeshinskaia was not at all cunning when she claimed to have discovered the transition from dead to living matter: she simply turned flawed experiments into "science," receiving support from Soviet power. While for Dobrenko, living matter is formless material and for Vernadskii, it is something "clear and simple," as cited above, for Lepeshinskaia living matter was not just a name for liquid produced by cells during experiments, independent of any kind of scientific criticism. For Lepeshinskaia it was something more—something that contained great possibilities.

Understanding "matter" as a synonym for "material," Lepeshinskaia used this concept for the designation of a particular substratum: i.e. that which has not yet been formed—amorphous. In this case "life," as a predicate of "matter," acts as the strength which endows with form. Thus, "living matter" is allotted the capability of becoming any kind of living organism, insofar as it contains the forms of all living things in potential. The realization of one or another potential depends on external factors. The environment for living matter can be inanimate material, just as it can be living material. And, if in the face of favorable conditions living matter grows at the expense of in-

animate matter, it means that the surrounding inanimate nature has been "swallowed up by the living" and is compelled to conform to this living material, structured and "rationalized" by it. Thus, living matter stops being simply liquid in the test tube but can be understood as all living things in the form of unrealized potential. In this it is easy to see an allegory for the Soviet Union, which found itself in the process of constant construction and synthesis and whose borders were noticeably enlarged after World War II.

As has already been pointed out, the historical dimension, for Lepeshinskaia, crosses over into the area of space and, consequently, is structured by borders. Living matter itself, understood as a substratum for all of life, constitutes the borders of cells: "Клеточная оболочка представляет собой поверхностный слой живого вещества протоплазмы клетки, изменившися под влиянием среды, несколько более плотный, чем живое вещество внутри самой клетки" (*Kletka* 11).[17] And, if dead matter is unable to traverse the border of the living on it own, than, in living matter, the innumerable borders of cellular constitution are easily surmountable. Moreover, at the expense of these "individual" borders there occurs a correlation of living matter within itself: "Оболочка обладает способностью пропускать через себя одни вещества и задерживать и видоизменять другие вещества. Эта способность оболочки называется избирательной проницательностью" (13).[18] This "izbiratel'naia pronitsatel'nost'" (selective insight) is conditioned on the fact that the cell membrane also changes properties under the influence of the surrounding environment. Lepeshinskaia defines this membrane as the "living structure of living cells" (13). Thus, living matter itself is, in a sense, the Great Medium, able not only to transfer information, but to create it.

However, in contrasting dynamic Organicism with static Mechanism, Lepeshinskaia understood that she had condemned living matter not only to modifications, but also to death. "Жизнь и клетка когда-то произошли, где-то образовались, т.е. имеют начала, а что имеет начало, то имеет и конец" (*O zhizni* 19).[19] Of course, Lepeshinakaia's motivation in her search for resources for the prolongation of life can be viewed as her subjective desire for the prolongation of her own life, as she herself was already advanced in years. It is not by chance that living matter was discovered by Lepeshinskaia during the study of the age of cells. Communication, as Lepeshinskaia noted, is life, and death comes from the loss of the

"izbiratel'naia pronitsatel'nost'" when, during the ageing process, the cell membrane becomes thinner and flatter" (*Kletka* 12) and is unable to communicate with the surrounding environment, no longer able to independently distinguish "good" (i.e. Soviet Truth) from "bad." Lepeshinskaia herself found deliverance from old age in rejuvenating soda baths, which allegedly influence the human body such, so that the cellular membrane retain the optimal condition of their "izbiratel'naia pronitsatel'nost'."

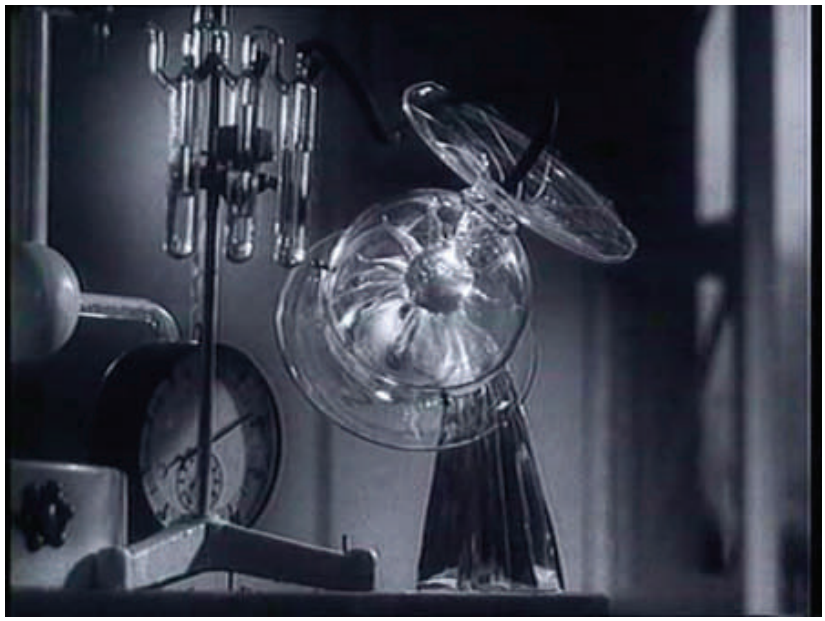

Figure 1: Device for catching solar energy in *Vesna*

"The fact of the matter is that the Soviet scientist lives and works in the heart of the contemporary moment. He wants to possess the sun in order for life to become easier and better. And he thinks not only of formulas, but of human happiness. He is a man!" says Shatrova, the female scientist from Grigorii Aleksandrov's film *Vesna* [Spring] (1947) (fig 1). The contemporary viewer of this film can clearly see Ol'ga Lepeshinskaia in the image of the film's heroine, regardless of the fact that at the time of the film's release Lepeshinskaia was seventy-six years old. And, taking into consideration that the film was released shortly before the awarding of Lepeshinskaia with the Stalin prize, it is possible that the scientist saw her own re-

flection on the screen: indeed, she believed in the effect of her discovery—the prolonging of life.

In analyzing the theories of Oparin and Vernadskii and the pseudo-scientific fantasies of Gor'kii and Lepeshinskaia on "living matter," it is possible to understand how Soviet culture and its position in space and time is transformed. If, in the middle of the 1920s, Soviet culture did not recognize any spatial boundaries, wanting to neatly define itself within vertical history, then, beginning with the 1930s and continuing to the end of the 1940s, time ceases to be significant, yielding to horizonontal space.

Notes

1. These include works by Gaisinovich, Joravsky, Muzrokova, Rapaport, and Soifer.
2. See Bodganov, Gasparov, and Murashov.
3. See Lepeshinskaia (*Moi vospominaniia*, *U istokov*, and *Vstrechi*) and Safonov.
4. [an intense experience of something alien and far away – in both thought and spirit.]
5. For more on this see Vernadskii, *Dnevniki.*
6. [Every living organism in *the biosphere* (a natural object) is a living natural body. *The living matter of the biosphere is the totality of the living organisms inhabiting it* (Vernadsky, *Scientific Thought* 23).]
7. [This notion is simple and clear and causes no misunderstandings. In science, we only study the living organisms and their communities, which present a scientific equivalent of the idea of life (Verdansky, *Scientific Though* 23)]
8. [Cosmic radiation, coming from all albuminous bodies, envelop the biosphere, penetrating and remaining in it.]
9. [The substance of the biosphere … is perforated by energy; it becomes active, gathering and distributing energy to the biosphere and, in the end, transforms it into energy in the terrestrial environment, which is free and able to work]
10. [In it for the first time man becomes a *large-scale geological force.* He can and must rebuild the province of his life by his work and thought, rebuild it radically in comparison with the past (Vernadsky, *Scientific Thought* 249).]
11. [Through what kind of miracle does inorganic matter transform into living matter, and living matter, having developed into a person, gives us Lomonosovs and Pushkins, Mendeleevs and Tolstois, Pasteurs, Markons, and hundreds of great thinkers, poets – those working on the crea-

tion of second nature, on what is created by our human thoughts, by our will.]

12. [This is the case: born by the earth, man fertilizes it with his labor and enriches it with the beauty of his imagination.]
13. [In culture 2, "living" is constantly used with a positive sign and is contrasted to the "mechanical" of the proceeding culture.]
14. [The Vitalists claim that living phenomena are separated from inorganic nature by an absolute precipice as they are the consequences of higher (supernatural) material with a purpose, subjugating all the physical and chemical processes of living beings.]
15. See Katsnel'son.
16. [There is not doubt that in a very remote time life was in that initial stage of development in which there were not yet cells, but existed only non-cellular living matter.]
17. [The cell membrane is the superficial stratum of the living matter of the protoplasm of the cell, changing under the influence of the environment, and is somewhat denser than the living matter within the cell itself.]
18. [The membrane possesses the ability to allow some substances to pass through itself and to detain and modify other substances. This ability of the cell is called "selective insight."]
19. [Life and the cell originated at some point in time, were constituted somewhere: that is, they have a beginning, and what has a beginning also has an end.]

Works Cited

Aleksandrov, Grigorii, dir. *Vesna.* Mosfil'm, 1947.

Bogdanov, K. "Ot pervoelementov N. Ia Marra k michurinskim iablokam: Ratsional'nost' i absurd v sovetskoi nauke 1920-1950-x gg." *Absurd i vokrug: Sbornik statei.* Ed. O. Burenina. Moskva: Iazyki slavianskoi kul'tury, 2004.

Danilevskii, A. Ia. "Zhivoe veshchestvo." *Vestnik Evropy.* V. 3. Moskva, 1896.

Dobrenko, E. *Politekonomiia sotsrealizma.* Moskva: Novoe literaturnoe obozrenie, 2007.

Gasparov, B. Razvitie ili restrukturirovanie. Vzgliady akademika T. D. Lysenko v kontekste pozdnego avangarda (konets 1920-1930-e gody). *Logos 1991-2005.* Izbrannoe: V. 2.1. Moskva: Territoriia budeshchego, 2006.

Gor'kii, M. "Children of the Sun." *Five Plays.* Ed. Edward Braun. Trans. Kitty Hunter-Blair and Jeremy Brooks. London: Meuthuen, 1988.

---. *Sobranie sochinenii.* V. 30. 26. Moksva: Gosudarstvennoe izdatel'stvo khudozhestvennoi literatury, 1949-1953.

Joravsky, D. *The Lysenko Affair.* Cambridge: Harvard U P, 1970.

Katsnel'son, Z.C. *Kletochnaia teoriia v ee istoricheskom razvitii.* Leningrad: Nauka, 1963.
Kratkii filosofskii slovar'. Ed. M. Rozentalia, P. Iudina. 2 ed. Moskva: Gosudarstvennoe izdatel'stvo politicheskoi literatury, 1940.
---. Ed. M. Rozentalia, P. Iudina. 3 ed. Moskva: Gosudarstvennoe izdatel'stvo politicheskoi literatury, 1952.
Le Dantek, F. *Zhivoe veshchestvo.* Moskva: Knizhnoe delo, 1898.
Lepeshinskaia, O. B. *Kletka i proiskhozhdenie.* Moskva: Sel'khozgiz, 1951.
---. *Moi vospominaniia.* Lit. zsapis' G. I. Eisurovich. Abakan: Khakknigoizdat, 1957.
---. *O zhizni, starosti i dolgoletii.* Moskva: Znanie, 1953.
---. *Proiskhozhdenie kletok iz zhivogo veshchestva. Stenogramma publichnoi lektsii, prochitannoi v Tsentral'nom lektorii –Obshchestva v Moskve.* Moskva: Pravda, 1951.
---. *U istokov zhizni.* Moskva: Detgiz, 1953.
---. *Voinstvuiushchii vitalizm: o knige prof. Gurvicha.* Vologda: Severnyi pechatnik, 1926
---. *Vstrechi s Il'ichem (vospominaniia staroi bol'shevichki).* Moskva: Gospolitizdat, 1957.
Murashov, Iu. "Pis'mo i ustnaia rech' v diskursakh o iazyke 1930-x godov: N. Marr." *Sotsrealisticheskii kanon.* Ed. Kh. Giunter i E. Dobrenko. SPb: Akademicheskii proekt, 2000: 599-608.
Nietzsche, F. *Sochineniia v 2 t.* T. 1. Moskva: Mysl', 1991.
Novogrudskii, D. "Geokhimiia i vitalizm: (O 'Nauchnom mirovozzrenii' akad. V. I. Vernadskogo)." *V. I. Vernadskii: Pro et contra.* SPb: PKhGA, 2000.
Oparin, A. I. "Problema proiskhozhdeniia zhizni v svete dostizhenii sovremennogo estestvoznaniia." *Filosofskie problemy sovremennogo estestvoznaniia.* Moskva: Akademiia nauk SSSR, 1949.
---. *Vozniknovenie zhizni na Zemle.* Novosibirsk: Novosibgiz, 1949.
Papernyi, V. *Kul'tura Dva.* 2 ed. Moskva: Novoe literaturnoe obozrenie, 2006.
Rapaport, Ia. "Nedolgaia zhizn' 'zhivogo veshchestva.'" *Nauka i zhizn'* 9 (1988).
Safonov, V. A. Besstrashie. Moksva: Molodaia gvardiia, 1951.
Soifer, V. *Vlast' i nauka* (*Istoriia razgroma genetiki v SSSR*). Ann Arbor: Hermitage, 1989.
Vernadskii, V. I. *Biosfera.* Leningrad: Nauchnoe khimiko-tekhnicheskoe izdatel'stvo, 1926.
---. *Dnevniki 1917-1921.* Kiev: Naukova dumka, 1994. Cited at <http://www.philos.msu.ru/libfiles/vernadskiy_1.txt>
---. *Nauchnaia mysl' kak planetarnoe iavlenie.* Moskva: Nauka, 1991.

Vernadsky, V. I. *Scientific Thought As a Planetary Phenomenon.* Ed. S. S. Ivanov. Moscow: Nongovernmental Ecological V. I. Vernadsky Foundation, 1997.