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Book review

# Technology as Creativity: A Review of Anna Demina and Alexander Nesterov‘s *Semiotic Theory of Creativity*

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## Abstract
The philosophy of technology has long suffered from a consequentialist bias, focusing on the effects and risks of technology rather than on its essence. Technical creativity, in particular, remains underexplored compared to artistic creativity, often being reduced to applied science or accidental invention. This review examines the monograph *Semiotic Theory of Creativity: The Problem of the New in Technology and Art* by Anna Demina and Alexander Nesterov which attempts to construct a universal theoretical model of creativity applicable to both technical and artistic domains. The authors of the monograph synthesize the three-act theory of technical creativity by Pyotr Engelmeyer, the concept of form-giving forces by Friedrich Dessauer, and the ontological model of general semiotics (Frege, Peirce, Morris). They correlate the three dimensions of semiosis (pragmatics, syntactics, semantics) with the three levels of cognition (sensory perception, understanding, reason) and introduce a fourth dimension related to the material expression of signs. The reviewed book offers a systematic analysis of the epistemological problems of creativity. It defines creativity as a process of novelty generation through the transformation of pragmatic, semantic, or syntactic rules of semiosis, resulting in new objects at the level of sensory perception, new things at the level of understanding, and new ideas at the level of reason. The authors identify nine possible ways of novelty emergence in technical and artistic creativity, using science fiction as illustrative material. The monograph represents a significant contribution to the philosophy of technology, breaking with both existentialist alarmism and Marxist reductionism. While the choice of science fiction as empirical material may be debatable, and some parts of the text serve a ritual rather than analytical function, the work provides a much-needed, operationalizable framework for understanding technical creativity. It is a substantial, necessary, and important publication that opens new directions for research.

**Keywords:** Technical creativity; Semiotics of technology; Problem of novelty; Philosophy of technology; Semiotics of art

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Рецензия

# Техника как творчество: Рецензия на книгу А.И. Деминой и А.Ю. Нестерова “Семиотическая теория творчества”

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**Аннотация**

Философия техники долгое время страдала от консеквенциалистского уклона, сосредоточиваясь на последствиях и рисках технического развития, а не на его сущности. Техническое творчество, в частности, остаётся менее изученным по сравнению с художественным творчеством, часто сводясь к прикладной науке или случайным изобретениям. В рецензии анализируется монография Анны Деминой и Александра Нестерова “Семиотическая теория творчества: Проблема нового в технике и искусстве”, в которой предпринята попытка построить универсальную теоретическую модель творчества, применимую как к технической, так и к художественной сферам. Авторы монографии синтезируют теорию трехакта технического творчества Петра Энгельмейера, концепцию формообразующих сил Фридриха Дессауэра и онтологическую модель общей семиотики (Фреге, Пирс, Моррис), соотносят три измерения семиозиса (прагматика, синтактика, семантика) с тремя уровнями познания (чувственное восприятие, рассудок, разум) и вводят четвёртое измерение, связанное с материальным выражением знаков. Рецензируемая книга предлагает системный анализ теоретико-познавательных проблем творчества, которое определяется как процесс возникновения новизны, осуществляемый за счёт трансформации прагматических, семантических или синтаксических правил семиозиса и влекущий за собой появление новых объектов на уровне чувственного восприятия, предметов на уровне рассудка и идей на уровне разума. Авторы выделяют девять возможных способов возникновения новизны в техническом и художественном творчестве, используя в качестве иллюстративного материала научную фантастику. Монография представляет собой значительный вклад в философию техники, преодолевая как экзистенциалистский алармизм, так и марксистский редукционизм. Выбор научной фантастики в качестве эмпирического материала может быть дискуссионным, а некоторые фрагменты текста несут скорее ритуальную, нежели аналитическую функцию, однако в целом работа даёт востребованную, операционализируемую рамку для понимания технического творчества. Книга получилась основательной, нужной и важной, открывающей новые направления для исследований.

**Ключевые слова:** Техническое творчество; Семиотика техники; Проблема новизны; Философия техники; Семиотика искусства

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## INTRODUCTION

Despite the importance of the role that technology plays in modern life, there exists a significant theoretical gap in understanding its essence. This does not mean that we fail to engage in the analysis of technology; rather, the problem is that philosophical reflection most often addresses its consequences or the potential threats of its application. The very essence of technology itself, meanwhile, either remains bracketed out or is treated as an applied aspect of the development of human cognitive capacities, in effect becoming the *alter ego* of scientific cognition.

Given that the authors, in the course of their professional activities, frequently work with undergraduate and graduate students in technical fields – and one of them has for many years taught a specialized course in the philosophy of technology and the technical sciences – the lack of serious analytical works in the philosophy of technology is evident to them. Whereas early philosophy of technology, represented by Ernst Kapp (1877/1925) and Pyotr Engelmeyer (1910/2010; 1912/2013), was compelled by its constitutive status to address questions concerning the conceptual essence of technology and technical creativity, in the twentieth century this problem receded into the background for a long time. This is precisely why the philosophy of technology in the twentieth century is typically placed within the existentialist tradition. In this tradition, the noospheric concepts of Vladimir Vernadsky (1977/2013) and Pierre Teilhard de Chardin (1955/1965) appear almost as religious sermons, while the gloomy alarmist texts of Martin Heidegger (1954/1993) and Karl Jaspers (1949/1986) are received rather indifferently by future engineers and scientists. These texts do nothing to open their eyes to the specifics of their future work, yet they constantly point to the burden of moral responsibility. This is experienced as a certain deficit of rationality and is typically rejected by the critical thinking of the future technical specialist.

This nuance partly became, in Soviet and subsequently Russian philosophy, a consequence of the fundamental pattern within the Marxist tradition of interpreting technology as both a result and a cause of the alienation of human essence, which inevitably generated a negative connotation for this problem domain. The situation in Russian philosophy of technology began to change only in the last decade, largely due to the efforts of the authors of the book under review. For instance, in 2017, Alexander Nesterov translated and published in Russian Friedrich Dessauer's (1956/2017) fundamental monograph *Streit um die Technik*, nearly sixty years after its publication in the original language, thereby breaking the long-standing trend of a consequentialist attitude toward technology and technological progress. In 2024, a new expanded translation by Nesterov was published, also including Dessauer's work *Mensch und Kosmos: Ein Versuch* (Dessauer, 2024). Now we see how, on a new methodological basis, a new philosophy of technology is taking shape. The monograph under review attempts precisely to present the problem of technical creativity as a type of positive rational transformation of reality.

## PROBLEM STATEMENT

Demina and Nesterov's monograph address the problems of the theoretical justification of the rationality of the creative process in technology and art (Fig. 1). Strictly speaking, the question of the creative nature of art quite often becomes a topic of scholarly inquiry, not only by philosophers but also by cultural theorists, art historians, and, more recently, psychologists. At the same time, technical creativity is much less frequently examined as a process of creating new entities; at best, it is regarded as a sphere of applied science. Perhaps a disservice to the technical sphere is done, on the one hand, by the close kinship of technology with invention, where the first great inventions turned out to be the result more of accidental discoveries than of intentional creativity, and, on the other hand, by its close connection with the natural sciences and the criticality of thinking inherent in all scientists – this criticality that separates engineers from artists or creative practitioners with their propensity for unbounded flights of thought. In this respect, technical creativity is much less inclined to see in the creative act a transcendent transition into the beyond, which leads the authors to seek the origins of technical creativity not in the works of the existential-phenomenological tradition but in more rationally constructed methodologies, in particular in the semiotic approach. Indeed, since the engineer does not merely realize their own imagination but does so within the already existing frameworks of the logic of thinking and the available technological possibilities, the question of the criteria and boundaries of novelty in technology becomes key to understanding the essence of creativity.

**Figure 1.** Book Cover of "Semiotic Theory of Creativity: The Problem of the New in Technology and Art" by Anna Demina and Alexander Nesterov

## AIMS AND METHODOLOGY OF THE STUDY

The question of the ways of understanding and identifying the new in the sphere of technology is by no means purely theoretical. In the contemporary world, there exist numerous ethically and legally problematic situations related to the observance of copyright and patent law, cases of commercial and military industrial espionage concerning the protection of national and corporate brands, and many similar cases. Obviously, the resolution of all these concrete tasks depends to a large extent on a general understanding of the phenomenon of novelty in the sphere of technology and technics. According to the authors, the problem is rather that such an understanding simply does not exist at present:

> At present, the diversity of approaches to creativity in the particular sciences is not unified by a common ontology … we can conditionally speak of religious models of creativity in the works of Russian religious philosophers … who share an understanding of human creative ability as a manifestation of the human being's godlike nature, and a problematization of the relationship between creativity and freedom. The nature of the creative act, primarily the artistic one, is explored within the frameworks of existentialism … poststructuralism and postmodernism … however, a difficulty arises in scaling these theories to scientific and technical types of creativity when constructing a systematic positive theory of creativity. (Demina & Nesterov, 2025, pp. 7–8)

The authors, in fact, attempt to do precisely this throughout the book, employing as constructive elements Engelmeyer's three-act theory, the theory of creativity by Dessauer, and the ontological model of general semiotics of Gottlob Frege, Charles Sanders Peirce, and Charles Morris (Demina & Nesterov, 2025, p. 10).

In their view, "the existing tradition of studying the sign nature of semiotics is limited mainly to the language of art … yet the potential of semiotics as a universal methodology and ontology is not fully utilized" (Demina & Nesterov, p. 10). Thus, the aim of the work is to construct a universal theoretical model of creativity that is relevant in situations of both technical creativity and art.

## RESULTS OF THE STUDY

The first chapter, "Ontological, Epistemological, and Praxeological Aspects of Creativity," is devoted to a comprehensive analysis of the situation of creativity. Here the authors follow the approach of Vadim Konev (1998), distinguishing three paradigms of research: the ontological, the epistemological (gnoseological), and the praxeological (existential).

Discussing the ontological aspects of creativity, the authors trace the evolution from ancient conceptions of creativity as the reproduction of the cosmic world order through

imitation (mimesis) to the medieval perception of the world through faith and participation in the divine creation of the world out of nothing (Demina & Nesterov, 2025, pp. 28–32), and then to the transformation of ontological conceptions of the nature of the new into an epistemological interpretation of creativity in the philosophy of the modern period. At the same time, in German classical idealism, and especially in Georg Wilhelm Friedrich Hegel and Friedrich Wilhelm Joseph Schelling, the sphere of the new is the sphere of contradiction between the absolute freedom of spirit and the inertness of nature in general and of human nature in particular (pp. 32–34).

The emergence and rapid development of psychology in the nineteenth and twentieth centuries form a new tradition of creativity research, drawing on the concepts of intuition, illumination, insight, imagination, and the relationship between the conscious and the unconscious (Demina & Nesterov, 2025, pp. 35–39). On the one hand, this inevitably leads to the dominance of biological determinism in theories of creative behavior. On the other hand, it gives impetus to the development of cognitive science as a synthetic discipline that unites the biological and social aspects of creativity (pp. 40–45).

According to the authors, the limitations of psychologism in the theory of creativity can be overcome through the activity-based approach. Here the authors make full use of Engelmeyer's systematic theory of technical creativity:

> The essence of the three-act theory lies in distinguishing three stages in any creative act, stages which "would recur in all inventions, regardless of external circumstances and the forms of the process itself," and which are functions of three active forces: desire, knowledge, and skill. The force of desire is embodied in the first act, which Engelmeyer calls the act of intuition, or of desire, and associates with conjecture; as a result of this act, the creator passes from vague desire to a conception, an idea, a hypothesis, a task … The second act is connected with the force of knowledge; it is designated as the "act of knowledge and reasoning," and has as its task the elaboration of a plan, a scheme, a construction. If the active force of the first act is intuition, then in the second act "methodical thinking," understanding, logic come into play … The third act is the "act of skill" or mastery, connected with the embodiment of the plan/construction, the initial conception/idea, in matter … According to Engelmeyer, the third act requires the fulfillment of the greatest number of conditions, since material comes into play, and the task breaks down "into as many separate tasks as there are separate parts in the machine" (Demina & Nesterov, 2025, pp. 51–52).

Thus, in the third act, the contradiction between the freedom of the creative capacities of thinking and the limited possibilities of their material embodiment is resolved. The fact that the action of the third level itself is by no means carried out by the subject of creativity (for example, the conception of a fashion designer or an automotive engineer is carried out by an artisan) highlights the operational limitations of the theory. <On the other hand, ut constitutes an absolutely necessary element in technical creativity.

The second chapter, "General Provisions of the Semiotic Interpretation of the Problem of the New in Creativity," establishes the methodological and ontological

frameworks for a transcendental-semiotic interpretation of creativity. It examines the structure of the creative act, and the concept of novelty is presented as the result of a shift in pragmatic, syntactic, and semantic rules at the levels of sensory perception, understanding, and reason (Demina & Nesterov, 2025, p. 57).

On the basis of a synthesis of the two existing semiotic traditions – the European tradition, associated with the work of Ferdinand de Saussure, and the American tradition, associated with the names of Peirce and Morris – the authors conclude that the three main dimensions of semiosis (semantics, syntactics, and pragmatics) correspond to the levels of cognition traditional in modern European philosophy: sensory perception (*sensus*), understanding (*ratio*), and reason (*intellectus*), which are irreducible to one another and have their own a priori forms (rules) (Demina & Nesterov, 2025, p. 66). In addition, a fourth dimension of semiosis is identified, which registers the relation of the sign to its material expression. This gives rise to a duality: "on the one hand, there exists the principle of the invariance of information with respect to the physical properties of the carrier … on the other hand, matter imposes certain limitations on the sign process" (p. 65). These levels, in turn, are correlated with the stages of creativity in Engelmeyer's three-act theory (desire, knowledge, skill) (p. 67), as well as with the three-fold conception of technology by Friedrich Dessauer, There is

> [t]he investigating human – *homo investigator* – the human capacity for representation, imagination, goal-setting; the inventing human – *homo inventor* – the capacity for organization, combinatorics, transformation on the basis of the laws of nature; the working human – *homo faber* – the capacity for working with matter, for embodying a scheme, the capacity "to transcend the represented from intramenial space, from the world of representations into the external world, into the environment of one's perception." All three capacities make possible the creative act, understood by Dessauer as an act of transcending from the intelligible world … of pre-established forms of solving problems through the transformation of matter on the basis of the laws of nature (Demina & Nesterov, 2025, pp. 67–68).

Accordingly, the authors correlate the fourth dimension of semiosis with the human capacity, potentially conceivable within Dessauer's philosophy, for connecting worlds (levels of being). Thus, the authors arrive at their own definition of creativity:

> Creativity is a process of novelty generation, realized through the transformation of pragmatic, semantic, or syntactic rules of semiosis, entailing the emergence of new objects at the level of sensory perception, new things at the level of understanding, and new ideas at the level of reason. The condition for the possibility of the creative act is the human being's capacity for connecting worlds (Demina & Nesterov, 2025, p. 69).

In the final, third chapter, "A Semiotic Interpretation of Novelty in Technical and Artistic Creativity," on the basis of the previously constructed theoretical model of creativity, "nine possible ways of novelty generation that can emerge as a result of an act of artistic or technical creativity are examined" (Demina & Nesterov, 2025, p. 76). On

the whole, the chapter is largely formal in character, since the main theoretical constructions have already been carried out by the authors in the two preceding chapters. Given the three dimensions of semiosis (pragmatics, syntactics, and semantics) and the three levels of cognition (sensory perception, understanding, and reason), the authors interpret the creation of the new as a pragmatic, syntactic, or semantic shift (change of rules) at the sensory, rational, or reasonable levels of cognition, respectively. As empirical material, they use texts belonging to the genre of science fiction. In the authors' view, "science fiction combines the properties of artistic fiction and scientific modeling and is largely focused on the problematization of the prospects for the development of humanity conditioned by scientific and technological progress" (p. 76).

## CONCLUSIONS AND DISCUSSION

In our view, the results achieved by the authors are quite impressive. To our knowledge, such a detailed theoretical analysis of creative processes with respect to technical creativity has not yet been carried out. The main rules for the formation of novelty in the field of technical creativity and art have been formulated and presented to readers – rules that are not speculative but quite operationalizable. In this connection, one can readily envision a purposeful engineering process that employs these rules and consciously shapes and justifies its own uniqueness and innovativeness on the basis of these criteria. In this sense, the work accomplished is complex, yet important and necessary.

Certainly, in any work one can find some shortcomings if one wishes. For example, the choice of science fiction as illustrative material in the third chapter is far from obvious. It is clear that science fiction has a connection to technology. At the same time, if we rely on Engelmeyer's three-act theory, the creative act in a literary text lacks the third act: the embodiment of the conception in reality – at least in the traditional interpretation of this expression. Perhaps one could consider visual or other performative means of art as a partial realization of a technical conception. But then the boundary between technology and art becomes so indistinct that the question arises: do we need two terms when one would suffice? In this respect, ancient *techné* fully covers both phenomena.

The beginning of the second paragraph of the second chapter, "Subject, Object, and the Process of Creativity as Environments for the Emergence of Novelty," seems rather strange and alien, as the authors devote a couple of pages to the peculiarities of the interpretation of the concept of activity in Marxist-Leninist philosophy (Demina & Nesterov, 2025, pp. 69-71). Admittedly, the category of activity in Marxism is one of the most important, and many works have been devoted to its analysis within the Russian intellectual tradition. However, this passage is not narratively connected to what precedes it, nor is it subsequently used.

As already noted, the book is substantial, necessary, and important. We wish for the authors to continue their work in this direction, since the need for serious literature in the philosophy of technology is still far from being satisfied.

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