

From the history of semiotics in the USSR: Georgy Kh. Shingarov

Original Study

Irina B. Ptitsyna
independent researcher, Russia
ptiirina@yandex.ru (ORCID: 0000-0002-5257-7501)

Received: 30. 3. 2023; Accepted: 12. 11. 2023

Abstract: Georgy Kh. Shingarov is one of the few philosophers of the Soviet period who studied the conditioned reflex as a sign system. The originality of his theory, created in accordance with the provisions of dialectical materialism, is shown. He considered the signal in the model of the conditioned reflex as a sign, explaining its formation by the process of dialectical 'sublation', i.e. the transformation of a material unconditioned stimulus into an idealized object, devoid of the properties of materiality, but which is the result of the manifestation of matter. The socio-political conditions that determined the features of this theory are described.

Keywords: Georgy Kh. Shingarov, conditioned reflex, signal, sign, history of semiotics in the USSR, dialectical materialism, sublation

INTRODUCTION

Soviet science was highly politicized and controlled by the state in allegiance to the ideals of Marxism-Leninism (Kolchisky 1999). The works of the founders of Marxism/Leninism served as a 'guiding star' for the 'correct' philosophy and science. Dialectical materialism was recognized as the only correct philosophical direction, and idealism was banned. The development of semiotics was also associated with significant difficulties. V. I. Lenin in his work (1968 [1009]) criticized the theory of perception, or as he called it, von Helmholtz's 'theory of hieroglyphs', as an idealistic theory. "In his sign theory of perception as expressed in his early career (1848–1868), Helmholtz argues that the mind makes a series of mental adjustments, 'unconscious inferences', to construct a coherent picture of its experiences. Helmholtz argues that spatial position, often used as a criterion to individuate objects, is an interpretation of our sensations, and not their immediate result" (Patton 2023 [2008]). This theory of perception of the perception of the world as a system of signs (Yaroshevsky 1960-1970, Patton 2023 [2008]) preceded the Umwelt theory created by J. von Uexküll (Uexküll 1921 [1909]).

V.A. Uspensky (1995) and N.V. Poselyagin (2020) wrote about the problems of semiotics in their memoirs. Soviet semioticians, in order not to draw too much attention to their work from regulatory authorities, replaced the term 'semiotics' with the term 'secondary modeling systems' (Lotman 1964), which was later used by Yu. M. Lotman in relation to cultural objects as sign systems. In 1971, Stepanov's book *Semiotics* was published, where the first phrase is the definition of semiotics: "Semiotics is the science of sign systems in nature and society" (1971, 3). He further clarifies that semiotics studies the quantitative and qualitative aspects of systems, that is, reduces semiotics to system-structural studies. However, he also has to substantiate the need for the development of semiotics as a science of the study of structures from the point of view of Marxist-Leninist philosophy.

The history of Soviet semiotics is not very well known outside the country, partly due to the language barrier and the difficulty of publishing outside the country.

Vyach. Vs. Ivanov (1976) in his book on the history of semiotics (1976) talks about many Soviet semioticians of

that time, but not about all of them. George Khristovich Shingarov (1978) has been left out of the spotlight and his work is little known. Ivanov's book analyses his works and why he ended up in the 'dark zone'.

Shingarov was born on September 7, 1934 in Bulgaria. In 1958 he graduated from the Sofia Medical Academy (now the Sofia State Medical University). From 1961 to 1962 he studied at the postgraduate course at the Department of Marxism-Leninism of the Sofia Medical Institute. From November 1962 to November 1967 he served as a psychiatrist at the Psychiatric Hospital No. 3 named after V.A. Gilyarovsky, in Moscow. In 1966-1972 he worked at the Institute of Philosophy of the Academy of Sciences of the USSR; then, at the Department of Philosophy of the Academy of Medical Sciences. From 1991-1999 he worked at the Research Center "Medical Museum" of the Russian Academy of Medical Sciences. Since 1999 he has been working at the Modern Humanitarian Institute (SGI) and at the Faculty of Philosophy of Moscow State University. His PhD thesis was titled "Emotions and feelings as a form of reflection of reality" (1966). His Dr. Sci. thesis was titled "Methodological problems of the physiology of higher nervous activity" (1972). (Big biographical encyclopedia 2009)

Shingarov's sphere of interest included not only sign systems, but also many other questions of philosophy and physiology (Shingarov 1985, 2013, 2018; Shingarov, Tatarovskaya 2016). In the book (1978) under discussion, he considers conditioned reflexes as sign systems on the basis of the fact that they include a sign. As a sign, he understood the stimulus that causes a conditioned response.

The conditioned reflex model (CR) (Pavlov 1927) as the simplest and most well-known model of behaviour has attracted the attention of many researchers as an object. According to Pavlov, a conditioned reflex is a model of behaviour of the "stimulus-reaction" type, where the role of the stimulus is played by the signal, and the role of the reaction is the response of the digestive system or the motor response. Reinforcement is a condition for maintaining or developing a conditioned reflex, and a connection is developed between the signal and reinforcement, where the signal means subsequent reinforcement.

The conditioned reflex has been repeatedly considered as a sign system by many authors. Charles Morris (1955 [1946]) reviewed the early work, where the presence of a sign (signal) was considered by the authors to be a sufficient sign of the existence of a CR as a semiotic system. A stimulus associated with reinforcement was considered as a sign. Later, the opinion about the CR as a sign system developed. Among the conditions under which a stimulus in the CR can be considered as a sign were: there must be a delay between the stimulus and the reaction under study; the reaction caused by the sign must correspond not to the sign itself, but to some other object (Morris 1955 [1946]).

In the USSR, the first semiotician who drew attention to the CR as an object of study was Yu. Stepanov. He considers them as an iconic system from the point of

view of structuralism: the role of the sign was determined by the animal itself:

such a situation: the bell rings, the dog, accustomed to this call as a signal, goes and takes the meat. [...] Indeed, if we follow the definition of a sign system adopted by us as an intermediary system between two other material systems (see III, 1), then the intermediary (sign or sign system) in this case is not the bell, but the dog: after all, it is the dog that connects the bell and the meat as different ends of the same chain. This conclusion will not seem so paradoxical now, after the generalization of Frege's triangle. The dog can also have a real meaning of the sign in this situation, for example, for an external observer of the entire system, say, for an experimenter sitting behind a soundproof partition, when, not hearing a bell and not seeing meat, but seeing that the dog has risen and is making certain movements, he concludes that the bell has rung and the meat has been served." (1971, 88)

Subsequently, other works appeared that considered the CR as a sign system (Krampen 1997).

Initially, the CR came to Shingarov's attention as a manifestation of the reflection theory (1974), one of the most sought-after philosophical theories in the Soviet era. The author considered the signal as a sign that causes a conditioned response using the CR model in his book and later in articles (1978, 2008, 2012). Shingarov in the USSR was among the very few (Stepanov 1971; Mochalov 2015) who began to consider the conditioned reflex as a sign system. In his 1978 book he writes that he relies on the Marxist-Leninist theory of reflection as a methodological principle. The link to the work of V.I. Lenin (1968 [1909]) is used as evidence of the rejection of von Helmholtz's 'theory of hieroglyphs'. It must be borne in mind that such a law-abiding text was created not only out of fear of censorship bans, but mainly because Shingarov himself was an ardent supporter of dialectical materialism, which he wanted to enrich with a new illustration. This is the case when ideology, the role of which was played by official philosophy, determined the course of scientific reasoning.

The book contains interesting finds, the meaning of which is not outdated. In the second chapter "Meaning and Information", considering the logical-semantic theory of information, which differs from the well-known mathematical model of Shannon's information theory: "From this point of view, semantics (the information content of a statement) is richer the greater the number of alternatives or 'possible worlds' that a given statement does not allow or exclude. In other words, the semantic-informational content of a statement is determined not by what the statement contains, but by what it excludes. Precisely because tautological statements contain all possible alternatives, their semantic-informational content can be considered zero" (1978, 28). To do this, he cites philosophical concepts which can now be seen as the justification for Kalevi Kull's concept of choice (2018).

He also writes about choice as a condition for the development of a conditioned reflex, when a generalized conditioned reflex is replaced by a specialized reflex. In this case, the presented signal is recognized from other accompanying extraneous stimuli.

Shingarov was already familiar with the works of Gottlieb Frege, Charles Sanders Pierce and Michel Breal as the founders of the theory of signs. However, Shingarov (1978) created his own very peculiar theory of sign and meaning, not without originality, but it does not fit well with modern knowledge about the sign. In his book, Shingarov (1978) writes that behaviour is based on a set of conditioned reflexes, but does not consider the relationship of the organism with the environment as a process of semiosis. He does not believe that the unconditioned reflex has a symbolic nature. In his opinion, the sign is associated with the complex "unconditioned stimulus – a certain state of the organism or its separate bioconstant, due to which it causes the corresponding activity of this organism" (1978, 194).

Shingarov considers the signal to be a sign because of its special nature. He had to revise the very concept of a conditioned reflex and introduce the concept of 'identical substance', which, as it were, reconciles the ideality of the sign with the materiality of the reinforcement.

On page 112 of the book under discussion, the author gives a model of the unconditioned reflex $S - R - S1$, where S is the unconditioned stimulus R , activity $S1$ is the learned stimulus. For example, S is food that acts on the mucous membrane of the mouth, R is salivation, and $S1$ is food soaked in saliva. Under the conditioned reflex, the author understands the following: "In the formed conditioned food reflex, this structure can be represented as follows: a signal (containing the mind in the form of filming) – the activity of the body – reinforcement (food actually digested in some way).

"An analysis of the structure of unconditioned and conditioned food reflexes shows that the 'beginning' and 'end' of the body's activity coincide in them. The same food acts both as an unconditioned stimulus – the cause, and as an assimilated object – reinforcement" (1978, 129). The model of the conditioned reflex is somewhat different: "The conditioned reflex proceeds according to the general formula: $\sigma - R - S1$ (σ – sign, $S1$ – reinforcement). S as an unconditioned stimulus is associated with the state of the organism, together with which it acts as a cause. The sign σ is associated precisely with the complex 'unconditioned stimulus' – a certain position of the organism or its separate bioconstant, thanks to which it causes the corresponding activity of this organism" (1978, 194).

Shingarov was looking for an opportunity to explain the nature of the sign within the framework of dialectical materialism. Since materialism did not recognize the autonomous existence of ideal objects, such as mental images and consciousness, the accepted explanation for their existence was to consider that they are a specific product of the brain as an element of the material world.

In order to operate with such a concept from the ideal world as the Shingar sign, he proposed to introduce the concept of 'identical substance'.

Shingarov uses another way to explain the mechanism of the origin of the sign. He is attracted by the Hegelian notion of 'sublation' (Aufheben) (Hegel 2010 [1812-16]). For example, he writes that in the rustle for a hare there are the teeth of a predator in a sublated form. This term is used by Hegel in a broader sense to denote the preservation or keeping hidden within the previous stage something latent to the next stage, but the example given is a special case where the subtracted view can be considered as a signifier. But Shingarov uses the term 'sublation' in the sense in which it is interpreted by dialectical materialism, that is, in relation to a material object.

Later Shingarov's articles (2008, 2012) repeat the main points of the book. He recognizes the conditioned reflex as a sign system and considers it as a three-term structure, while retaining his previous model of the system presented in the book mentioned above. He writes: "The Pavlov conditioned reflex is a special case of signaling activity, where the designate and the sign are not connected with each other before the creation of the conditioned reflex, they may have nothing in common" (2012, 13). He does not refer to the classification of signs by Charles Pierce, but it is obvious that this sign belongs to the class of symbols. The author does not explain the connection between conditioned and unconditioned reflexes by the processes of learning or memory, since these concepts were not used by Pavlov.

To complement his understanding of the conditioned reflex as a sign system, Shingarov relies on temporal differences, on the fact that the reaction to an unconditioned stimulus occurs immediately, and to a conditioned one before food enters the mouth. He again turns to the philosophy of Hegel. He explains temporal differences with the help of reason and purpose,

The same object of the external world (an unconditioned stimulus), depending on how much the organism has mastered it in practice, exists in a dual form - causes and goals. This is the 'splitting' of the unconditioned stimulus, the 'wrapping' of relations, the bifurcation of the unconditioned stimulus into a cause and reinforcement is directly related to what goes over to the side of the signal, what is contained in the signal, what becomes the ideal content of the sign. The ability to motivate, to be a cause is sublated from the material existence of an unconditioned stimulus in the process of the formation of a conditioned reflex. The signal becomes the carrier of the force that causes the activity of the organism. Thus, the motivating ability of the idealized, 'dematerialized' unconditioned stimulus is combined with the sensually perceived body of the stimulus that is indifferent at the beginning of the formation of the conditioned reflex." (2012, 14).

This can be understood in such a way that in the process of formation of a conditioned reflex, the removal of

its objective material existence from the unconditioned stimulus occurs with the transfer of its motivating, causative ability to the signal.

In a similar way, Shingarov explains the connection between 'sublation' and the transformation that takes place in Pierce's triad. This is not surprising, since it is known that while working on the theory of signs, Peirce became interested in Hegel's philosophy (Stern 2013, I, II parts). Here Shingarov also uses Hegel's philosophy in the interpretation of dialectical materialism. He is given the opportunity to do this by the fact that in the structure of the triad both the sign and the object denoted by the sign are things.

One can compare the transitions from the triad of the lowest level to the highest with Hegel's idea of the Absolute. Two elements of the triad are parts of a sign: an object and another object, which serves as a sign of the first object (Peirce makes a reservation that these can be not only objects, but also phenomena, ideas, etc., but in fact he uses material objects, if we turn to his classification of signs) become a full-fledged sign if they are subject to interpretation. A triad of the next level arises – a mental object and a mental sign of this object, which also require interpretation, this time interpretation of interpretation. But the emergence of a new interpretation creates a pair of a new level – the image of the image of an object and the sign of the sign of this object, which are again interpreted, resulting in a chain of interpretation of interpretation of interpretation going into infinity. This process is well described in the encyclopedia article:

"And so on. Thus, if there is any sign at all of any object, then there is an infinite sequence of signs of that same object. So, everything in the phaneron, because it is a sign, begins an infinite sequence of mental interpreters of an object" (Burch 2022, page number).

The Absolute is described with the same logic:

Finally, because the dialectical process leads to increasing comprehensiveness and universality, it ultimately produces a complete series, or drives 'to completion' (SL-dG 33; cf. SL-M 54; PhG §79). Dialectics drives to the 'Absolute', to use Hegel's term, which is the last, final, and completely all-encompassing or unconditioned concept or form in the relevant subject matter under discussion (logic, phenomenology, ethics/politics and so on). The 'Absolute' concept or form is unconditioned because its definition or determination contains all the other concepts or forms that were developed earlier in the dialectical process for that subject matter. Moreover, because the process develops necessarily and comprehensively through each concept, form or determination, there are no determinations that are left out of the process. There are therefore no left-over concepts or forms—concepts or forms outside of the 'Absolute' — that might 'condition' or define it. The 'Absolute' is thus unconditioned because it contains all of the conditions in its content, and is not conditioned by anything else outside of it. This Absolute is the highest concept or form of universality for that subject matter. (Maybee 2020)

The impossibility of considering the ideal as an independent category, and not a derivative of the material, as Marxism-Leninism believes, again leads Shingarov to the need to use the concept of 'sublation' as an explanation for the existence of this ideal as a derivative of the material.

It is logical that here Hegel's philosophy is applied to the ideas about the sign of such different authors. Hegel tried to find the logical rules of transition and transformation, ideal and material objects, he formulated his own laws, but could not prove them. Hegel's dialectic has been repeatedly criticized (Popper 1937 [1963]; Redding 2020). The very problem of transformation, evolution, development, i.e., movement in the philosophical sense in philosophy, is very complex and all the more complex because the development of objects in the material and ideal world is not described by the same laws.

The problem of conjugation or transition from the material to the mental (in the case of materialism, the production of the mental as a product of the material) was identified by Descartes as psycho-physiological (psycho-physical) and, despite numerous attempts, has not been solved so far.

In an article (2012), Shingarov develops the thoughts expressed earlier.

He gives a brief overview of the works of philosophers devoted to the conditioned reflex as a sign system:

Some authors believe that the conditioned reflex and the Pavlovian concept of 'signal' itself cannot be considered as a sign system and, accordingly, a conditioned stimulus as a sign. Others (T. Pavlov, A. M. Korshunov, V. V. Mantatov, L. A. Abramyan, etc.) consider the Pavlovian signal as a type of sign, and the conditioned reflex as a sign system. For example, L. A. Abramyan writes: 'A signal in the doctrine of conditioned reflexes is a phenomenon of the external world in relation to the nervous system of an animal, which, due to the establishment of a nervous connection, causes the same reaction in the body as an unconditioned stimulus. That's why it's called a signal, because between it and the signaled phenomenon there is the same relationship as between a sign and the signified' [5, p. 113]. (Shingarov 2012, 7)

Shingarov also explores the issue of a signal as a sign in a conditioned reflex, based on American psychological and physiological literature. He cites the opinion of G.-L. Holingworth, who believed that the connection between the concepts of "sign" and "conditioned stimulus" is carried out using the concept of 'reunion' (reintegration); K. Hall used the concept of "pure stimuli" (pure-stimulus acts) to denote a signal; Shingarov paid special attention to behavioural scientist E. Tolman. E. Tolman studied the behaviour of higher animals and humans as an activity where the signal plays a decisive role. He considered perception, inferences, memory, feelings, emotions, personal mechanisms as behaviour and considered all this to be sign phenomena (Shingarov 2012).

Shingarov also compares different points of view about what the meaning of a sign is: The first point of view belongs to C. Pierce and C. Morris, according to which the meaning of a sign is that it encourages the subject to take some action. Another point of view considers meaning as the subject's interpretation of the connection between a sign and that of which it is a sign (Shingarov 2012).

A very interesting achievement of Shingarov was that he considered as a sign system not only conditioned reflexes with a signal from the external environment, but also from the internal environment, that is, to some indicators of homeostasis. He cites experimental data from A. A. Zubkov and G. N. Zilova, who used injections of adrenaline solution as unconditioned stimuli, and Ringer's solution as unconditioned. In other experiments, Z. G. Androsova and her colleagues studied the conditioned reflex regulation of water-salt metabolism. In another type of experiment, S. M. Leites and G. T. Pavlov used insulin as an unconditioned stimulus and a bell as a conditioned one. The authors concluded that there is an effect of a homeostatic reaction aimed at balancing the parameters of the internal environment.

Another interesting phenomenon noticed but not discussed by the author is a pathological mental disorder – mental blindness and mental deafness. Unfortunately, this is all that Shingarov writes about this phenomenon, which is obviously important for biosemiotics. He writes that there are clinical observations that a person can perceive a physical phenomenon, but not understand its meaning. Perceiving physical parameters does not mean understanding what it is. Such phenomena are observed in patients with tactile, visual and acoustic agnosia, aphasia, which were discovered and studied by V.M. Bekhterev, J. Dejerine, G. Head and other doctors (Shingarov 2012).

Konstantin S. Mochalov (2015), a follower of Shingarov, also believes that reinforcement is the main thing in a conditioned reflex. His understanding of the sign system in relation to the conditioned reflex is similar to Shingarov's understanding and differs little from his.

CONCLUSIONS

A feature of the development of philosophy and science in USSR was that they were under the control of state ideology. Some forms of knowledge were under more pressure, some less. It was a big and very complicated story. Judging by the depth and breadth of his coverage of the topic, Shingarov is an extraordinary researcher. In some particular matters he was ahead of his time. Some researchers sincerely believed in the correctness of the legal philosophy, and some tried to avoid contact. Sometimes the researchers managed to 'pay off' with slogans about their loyalty. Shingarov's story is a sad story. He tried to apply the principles of dialectical materialism in semiotics, which was forbidden. It was a bold move. He created his original theory of the sign and even tried to explain the existence of the sign in Pierce's triad. However,

materialistic dialectics did not turn out to be an adequate tool for solving this problem, and therefore Shingarov's theory did not receive recognition in semiotics.

Acknowledgements

I would like to thank Professor of Biosemiotics Kalevi Kull for bringing this researcher to my attention. Many thanks also to the editors of *Linguistic Frontiers* and especially Ludmila Lacková PhD for review and editorial corrections.

REFERENCES

- Big biographical encyclopedia* [Bol'shaya biograficheskaya entsiklopediya Большая биографическая энциклопедия] (2009). Shingarov, Georgiy Khristovich. [Shingarov, Georgy Khristovich], available at: <http://biografii.niv.ru/doc/encyclopedia/biography/articles/3340/shingarov-georgij-khristovich.htm>
- Burch, R. (Summer 2022 Edition), Charles Sanders Peirce. *The Stanford Encyclopedia of Philosophy* Edward N. Zalta (ed.), available at: <https://plato.stanford.edu/archives/sum2022/entries/peirce/>.
- Hegel, G. (2010 [1812-16]). Georg Wilhelm Friedrich Hegel: *The Science of Logic* (Cambridge Hegel Translations) (G. Di Giovanni, Ed.). Cambridge: Cambridge University Press. doi:10.1017/9780511780240 available at: https://stradnieki.org/files/Science_of_Logic.pdf?ysclid=loy8sqjbxq981077231
- Ivanov, Vyach. Vs. (1976). *Essays on the history of semiotics in the USSR*. Moscow: Nauka, available at: https://inslav.ru/images/stories/pdf/1976_Ivanov.pdf
- Kolchisky, E. I. (1999). *In search of the Soviet "union" of philosophy and biology* [V poiskakh sovetskogo "soyuza" filosofii i biologii.]. Sankt-Peterburg: Izdatel'stvo Dmitriy Bulanin. available at: http://vivovoco.astronet.ru/VV/JOURNAL/SCIOLOG/S_1_03.HTM
- Krampen, M. (1997). Models of semiosis. In: Posner, Roland; Robering, Klaus; Sebeok, Thomas A. (eds.), *Semiotics: A Handbook on the Sign-theoretic Foundations of Nature and Culture*, vol. 1. Berlin: Walter de Gruyter, 247–287.
- Kull, K. (2018). Choosing and learning: Semiosis means choice. *Sign Systems Studies*, 46(4): 452-466.
- Lenin, V. I. (1968 [1909]). *Materialism and empirio-criticism*. [Materializm i empiriokrititsizm] Full composition of writings 5th ed. V.18. Moscow: Izdatel'stvo politicheskoy literatury. available at: <http://www.uaio.ru/vil/18.htm>
- Lotman, Yu. (1964). Program and abstracts of reports at the summer school on secondary modeling systems. August 19-29, 1964 [Vstupitel'noye slovo. [Introduction]. Programma i tezisy dokladov v letney shkole po vtorichnym modeliruyushchim sistemam. 19–29 avgusta 1964 g.]. Tartu: TGU.
- Maybee, J. E. (Winter 2020 Edition). Hegel's Dialectics,

- The Stanford Encyclopedia of Philosophy* Edward N. Zalta (ed.), available at: <<https://plato.stanford.edu/archives/win2020/entries/hegel-dialectics/>>.
- Mochalov, K. S. (2015). On the features of the sign system of the instrumental conditioned reflex [Ob osobennostyakh znakovoy sistemy instrumental'nogo uslovnogo refleksa]. *Sibirskiy zhurnal nauk o zhizni i sel'skom khozyaystve* [Siberian Journal of Life Sciences and Agriculture], 7(6): 2200-2221.
- Morris, Ch., 1955 [1946]. *Signs, Language, and Behavior*. New York. George Braziller.
- Morris Ch., 1964. *Signification and significance. A study of the relation of signs and values*. Cambridge, Mass. The M.I.T. Press.
- Patton, L, (Summer 2023 Edition), Hermann von Helmholtz, *The Stanford Encyclopedia of Philosophy* Edward N. Zalta & Uri Nodelman (eds.), available at: <<https://plato.stanford.edu/archives/sum2023/entries/hermann-helmholtz/>>.
- Pavlov, I. P., (1927). *Conditioned Reflexes: An Investigation of the Physiological Activity of the Cerebral Cortex*. (Anrep, G. V., trans. and ed.) London: Oxford. Oxford University Press. available at: <<http://psychclassics.yorku.ca/Pavlov/lecture23.htm>>
- Popper, K. R. (1937 [1963]). What is dialectic? *Conjectures and Refutations*, Routledge & Kegan Paul, London, p. 312-335. (A paper read to a philosophy seminar at Canterbury University College, Christchurch, New Zealand, in 1937. First published in: *Mind*, N.S., vol. 49, 1940. available at: <https://vordenker.de/ggphilosophy/popper_what-is-dialectic.pdf>)
- Poselyagin, N. V. (2010) On the notion of "secondary modeling systems": the history of the early russian structuralism. [K ponyatiyu "vtorichnyye modeliruyushchiye sistemy": istoriya rannego russkogo strukturalizma]. *Vestnik RUDN, seriya Teoriya yazyka. Semiotika. Semantika*, Bulletin of RUDN University, Theory of Language series. Semiotics. Semantics, 1, 13-20.
- Redding, P. (2020). Georg Wilhelm Friedrich Hegel, *The Stanford Encyclopedia of Philosophy* (Winter Edition), Edward N. Zalta (ed.), available at: <<https://plato.stanford.edu/archives/win2020/entries/hegel/>>.
- Shingarov, G. Kh. (1974). *Reflection theory and conditioned reflex [Teoriya otrazheniya i uslovnnyy reflex]*. Moscow: Nauka.
- Shingarov, G. Kh. (1978), *The conditioned reflex and the problem of sign and signification [Uslovnnyy refleks i problema znaka i znacheniya]* Moscow: Nauka.
- Shingarov, G. Kh. (1985). *Scientific work of I. P. Pavlov: problems of theory and method of knowledge. [Nauchnoye tvorchestvo I. P. Pavlova: problemy teorii i metoda poznaniya]*. Moscow: Meditsina,
- Shingarov, G. Kh. (2008). Pavlovian conditional reflex - natural science model of studying sign systems. [Pavlovskiy uslovnnyy refleks - yestestvennonauchnaya model' izucheniya znakovykh system]. *Epistemology and philosophy of science [Epistemologiya i filosofiya nauk]*. 18(4): 145–164.
- Shingarov, G. Kh. (2012). Conditional reflex – the natural-scientific model of the study of sign systems [Uslovnnyy refleks – yestestvenno-nauchnaya model' izucheniya znakovykh system], *[Vestnik Moskovskoy Gosudarstvennoy Akademii delovogo administrirovaniya. Seriya Filosofskiy, sotsial'nyye i yestestvennyye nauki]*. [Bulletin of the Moscow state Academy of business administration. A series of Philosophical, social and natural Sciences]. 13(1): 5–18.
- Shingarov G. Kh. (2013). Time, action, being and semantics: metaphysical foundations of verbal tense. Present time. *Bulletin of the Murmansk State Technical University*. 16(2): 397-402.
- Shingarov G. Kh. (2018). The socio-anthropoc idealization of objects and natural phenomena as a precondition for modern period science and medicine. *The Digital Scholar: Philosopher's Lab*. 1(4): 95-105 <https://doi.org/10.5840/dspl20181448>
- Shingarov, G. Kh., Tatarovskaya, I. G. (2016) Ontology and epistemology of the supernatural in African mythology. *[Ontologiya i epistemologiya sverkh'yestestvennogo v afrikanskoj mifologii]*. Moscow : Izd-vo SGU.
- Stern R. (2013), An Hegelian in strange costume? On Peirce's relation to Hegel I *Philosophy Compass* 8 (1):53-62 <https://doi.org/10.1111/j.1747-9991.2012.00531.x> and II *Philosophy Compass* 8(1):63-72 <https://doi.org/10.1111/j.1747-9991.2012.00530.x>
- Stepanov, Y. S. (1971). *Semiotika*. Moscow: Nauka.
- Uexküll, J. von, (1921 [1909]). *Umwelt und Innenwelt der Tiere. 2te vermehrte und verbesserte Auflage*. Springer-Verlag Berlin Heidelberg... DOI: 10.1007/978-3-662-24819-5 available at: <<https://archive.org/details/umweltundinnenwe00uexk>>.
- Uspensky, V. A. (1995). Walks with Lotman and secondary modeling. [Progulki s Lotmanom i vtorichnoe modelirovanie]. *Lotmanovskij sbornik 1*. [Lotman collection 1]. Moscow: Izdatel'stvo ITS – Garant, 99–127.
- Uspensky, V. A. (1994). On the problem of the genesis of the Tartu-Moscow semiotic school. [K probleme genezisa tartusko–moskovskoj semioticheskoy shkoly]. *Ju. M. Lotman i tartusko–moskovskaja semioticheskaja shkola*. [Yu.M. Lotman and the Tartu-Moscow semiotic school]. Moscow: 265–278.
- Yaroshevsky, M. (1960-1970). Hieroglyph theory. [Iyeroglifov teoriya]. *Filosofskaya Entsiklopediya [Philosophical Encyclopedia]*. In 5 V.. Ed. F. V. Konstantinov. Moscow: Sovetskaya entsiklopediya. available at: <<http://philosophy.niv.ru/doc/encyclopedia/philosophy/articles/79/ieroglifov-teoriya.htm>>