RUDN Journal of Philosophy. ISSN 2313-2302 (print), ISSN 2408-8900 (online) 2023 Vol. 27 No. 4 835—847
Вестник РУДН. Серия: ФИЛОСОФИЯ http://journals.rudn.ru/philosophy

Философия сознания и нейронауки

Philosophy of Consciousness and Neuroscience

https://doi.org/10.22363/2313-2302-2023-27-4-835-847
EDN: OTSTIN

Research Article / Научная статья

Philosophy and Neurosciences: Perspectives for Interaction

Vadim A. Chaly ✉

Lomonosov Moscow State University,
1 Leninskie Gory, 119991, Moscow, Russian Federation,
Immanuel Kant Baltic Federal University,
Russian Federation, Kaliningrad, 236041, Alexandra Nevsky, 14
✉vadim.chaly@gmail.com

Abstract. The study analyzes modern reductivist and antireductivist approaches to understanding the interaction between philosophy and neuroscience. It analyzes the content and grounds for using the concepts of neuroscience and neurosciences, philosophy of neuroscience, and neurophilosophy. The milestones in the development of neuroreductivism, from Patricia Churchland's arguments in support of intertheoretic reduction through Francis Crick's eliminativism to John Bickle's ruthless reductionism, are described. The ontological, methodological, and epistemic grounds for the reduction to neurosciences of other ways of representing mind and body are analyzed. Drawing on the post-Wittgensteinian paradigm of the philosophy of neuroscience of Max Bennett, Peter Hacker, and Andrew Reynolds, the semantic problems that arise in the neurosciences when epistemic reduction is attempted are described and derive from the inability to eliminate the basic metaphorical level of meaning-making and transmission rooted in everyday language and its figures, among which metaphors are fundamental. The descriptivist approach to the language of neurosciences is contrasted with neurorevisionism, an attempt to "correct" established ways of conceptualizing consciousness and corporeality, akin to earlier revisionisms, particularly physicalism, and forced to deal with similar problems. Reduction — the operation of the "return," itself understood metaphorically — and antireduction, which resists scientific revisionism and "returns" understanding to the level of everyday language and philosophy to descriptive work, is presented as a circular hermeneutical movement necessary for scientific and philosophical understanding, but not leading to disciplinary hegemony or the "victory" of either side. The study concludes with a sketch of the publications included in the rubric.

Keywords: neuroscience, reductionism and antireductionism, metaphors, revisionist philosophy, descriptive philosophy

Funding and Acknowledgement of Sources. This research was supported by the Russian Science Foundation (grant № 22-28-02041 “Perspectivism as an Epistemological Program”).

Article history:
The article was submitted on 05.10.2023
The article was accepted on 20.10.2023

For citation: Chaly VA. Philosophy and Neurosciences: Perspectives for Interaction. RUDN Journal of Philosophy. 2023;27(4):835—847. https://doi.org/10.22363/2313-2302-2023-27-4-835-847

Философия и нейронауки: перспективы взаимодействия

В.А. Чалый

Московский государственный университет имени М.В. Ломоносова,
Российская Федерация, Москва, 119991, Ленинские горы, д. 1,
Балтийский федеральный университет имени И. Канта,
Российская Федерация, Калининград, 236041, Александра Невского, 14
✉vadim.chaly@gmail.com

Аннотация. Проанализированы современные редуктивистские и антиредуктивистские подходы к пониманию взаимодействия философии и нейронаук, подвергнуты анализу содержание и основания для употребления понятий «нейронаука» и «нейронауки», «философия нейронаук» и «нейрофилософия». Описаны вехи развития нейроредуктивизма от аргументов Патриции Чёрчленд в поддержку «интертеоретической редукции» через элиминативизм Фрэнсиса Крика к «беспощадному редукционизму» Джона Бикла. Проанализированы онтологические, методологические и эпистемические основания для редукции к нейронаукам иных способов представления сознания и тела. С опорой на поствитгенштейнианскую парадигму философии нейронаук Макса Беннета, Питера Хакера и Эндрю Рейнольдса описаны семантические проблемы, возникающие в нейронауках при попытке эпистемической редукции и происходящие от невозможности устранить базовый метафорический уровень смыслообразования и передачи, коренящийся в обыденном языке и его фигурах, среди которых особенно важны метафоры. Дескриптивистский подход к языку нейронаук противопоставлен «нейроревизионизму» — попытке «исправить» сложившиеся способы осмысления сознательности и телесности, родственной более ранним ревизионизмам, в частности физикализму, и вынужденной иметь дело с аналогичными проблемами. Редукция — операция «возвращения», сама понимаемая метафорически, — и антиредукция, сопротивляющаяся научному ревизионизму и «возвращающая» понимание к уровню обыденного языка, а философию к дескриптивной работе, представлены как круговое герменевтическое движение, необходимое для научного и философского понимания, но не ведущее к дисциплинарной гегемонии или «победе» одной из сторон. В заключении статья содержит очерк публикаций, вошедших в рубрику.

Ключевые слова: нейронауки, редукционизм и антиредукционизм, метафоры, ревизующая и дескриптивная философия

Информация о финансировании и благодарности. Исследование выполнено при поддержке Российского научного фонда, проект № 22-28-02041 («Перспективизм как эпистемологическая программа»).

История статьи:
Статья поступила 05.10.2023
Статья принята к публикации 20.10.2023

Для цитирования: *Chaly V.A.* Philosophy and Neurosciences: Perspectives for Interaction // Вестник Российского университета дружбы народов. Серия: Философия. 2023. Т. 27. № 4. С. 835—847. https://doi.org/10.22363/2313-2302-2023-27-4-835-847

Terminology Matters

The first questions that arise when diving into the fascinating field to which this issue is devoted are terminological. Neurosciences or neuroscience? Neuroscience philosophy or neurophilosophy? The answer to the first can be attempted from the established word usage. In this case, in the English-speaking context, we will see the predominance of the singular — *neuroscience* — and the closer to the present day, the more decisive. In the Russian-language context, there is no such apparent preponderance of any of the two variants, and *neuroscience* neighbors *neurosciences*. Let us ask ourselves about the reasons for preferring one or the other option. We can assume that a conscious or spontaneous choice of ontological or epistemological approach will influence this preference. Suppose the main subject of study is considered to be the brain. In that case, it makes sense to consider the multitude of disciplinary traditions converging on this subject in their unity as neuroscience. Realist presuppositions, postulating a method-independent and method-dictating object, a view of knowledge as "reflection" or "correspondence," encourage this choice. If, on the contrary, the emphasis is placed on a variety of methods that allow the construction of representations that are incommensurable to such an extent that it becomes problematic to even talk about the unity of the subject revealed in different research perspectives, then the choice of the plural form, neurosciences, would be reasonable.

Additionally, a significant factor in the choice of terminology is the typical disciplinary struggle for hegemony: neuroscience implies the existence of a community of neuroscientists claiming to know, which removes the previous disciplinary heterogeneity and raises the scientific subject to a new level of understanding of the processes occurring in the most complex object of the part of the Universe known to man. The singular form thus implies the unity of the subject and the synthetic unity of the method belonging to this new social group with a common identity. Indeed, such rights in science find their basis not only in the external recognition and support given to the new discipline by governmental and other institutions, as well as by the enlightened public, but above all in the

fulfillment of the commitments made to describe better, explain, and predict phenomena in the brain and, most notably and seductively, in its correlates — individual consciousnesses and the human culture they create. To what extent neuroscience is already fulfilling and to what extent it can fulfill such promises is an open question.

On the contrary, the plural form recognizes the persistence of disciplinary pluralism and its inherent antagonism, which nevertheless points to a common fundamental interest in enriching the understanding of each party involved. The plural form is less ambitious in its promises because the sciences here share responsibility, allowing the assault on complex problems to be postponed. It also ensures that private sciences compete, claim each other's subject areas and languages, and localized zones of convergence and divergence emerge. This disciplinary competition becomes a factor in the development of neuroscience. In contrast, the development of neuroscience rather implies mobilization around a common big problem and simplification of complexity in approaches to its solution. In the latter case, even a utopian task can fulfill the role of a regulator that ensures the growth of scientific knowledge and the expansion of understanding.

Understanding is the main task of philosophy, and therefore, it retains its role, if not as a participant in its area of responsibility (as many philosophers and some scientists are convinced), then at least as a mediator between disciplines that study the brain in their unique ways. Philosophy acts as an archivist of the accumulated ways of thinking about scientific problems and as a partner, an interlocutor in methodological reflection, in attempts to inventory a specific set of conceptual tools used by one or another discipline. Philosophers find such work even in places — or above all in places — where, at first glance, clarity reigns. Alas, philosophy has the unfortunate property of creating problems with its interventions. Since the time of Socrates, this has made its intrusion not consistently or universally welcome and has provoked attempts to subject it to reduction. However, philosophical sterility, which turns out to be, in fact, naivety, costs science dearly, and philosophical work of clarification remains necessary.

Is a philosophy of neuroscience possible? Are the claims of neuroscience as a unified meta-discipline such as to preclude the possibility of philosophy as an outmoded way of asking questions and seeking answers? According to one position, the most that philosophy can claim as the "handmaiden" of the new mistress is to carry a trail of old problems that will shrink, becoming increasingly transparent as science penetrates the mysteries of the brain. Such hopes for a new meta-discipline that explains everything arise every time in times of rapid disciplinary growth — in sociology, in psychology, in logic. The clash between a positivist, reductionist, or even eliminativist attitude and an attitude of irreducibility and multiplicity is one of the defining issues in the relationship between philosophy and neuroscience — or neurosciences, after all.

Another terminological question concerns the relationship between the philosophy of neuroscience and neurophilosophy. It is answered quite clearly by

philosopher John Bickle, known for his radical reductionism: "The former concerns foundational issues within the neurosciences. The latter concerns the application of neuroscientific concepts to traditional philosophical questions. Exploring various concepts of representation employed in neuroscientific theories is an example of the former. Examining implications of neurological syndromes for the concept of a unified self is an example of the latter." [1]. A reductionist position in such a taxonomy means that the philosophy of neuroscience performs an auxiliary function to neuroscience dealing with fundamental problems and that neurophilosophy successfully works to translate traditional questions of philosophy into the language of neuroscience for later resolution, elimination, or clarification. A non-reductionist view, however, will notice that neuroscientific concepts are themselves composed using extra-scientific ideas, analogies, and metaphors, the understanding of which requires reaching a new round of philosophical endeavors. It is ironic that this return, too, can rightly be called a reduction — reducere means "to return." We may assume that this circle of reduction and the incessant attempts to realize it represent an essential hermeneutic component of the normal cognitive process; the desire to eliminate it hardly makes sense.

There are several ways to recount the history of the relationship between philosophy and brain research. The first starts from antiquity, sometimes as far back as Ancient Egypt [2], but more often with Aristotle as the founder of biology and author of the concept of *the psyche (psuche)*, which defined the understanding of living nature for centuries. This approach further considers the ideas of Galen and Nemesius of Emesa and, in general, in the spirit of Kuhn, sees the past paradigms as a valuable resource that holds unexpected possibilities for the future. In particular, such a history of neuroscience is offered by the authoritative work of Max Bennett and Peter Hacker, "Philosophical Foundations of Neuroscience" [3]. The second approach opens the history with the legacy of Descartes, believing that science in the proper sense of the word, including brain research, appeared in the New Age [4]. The third, adhered to, for instance, by Bickle, finds the first profound encounter between philosophy and neuroscience in the landmark work *Neurophilosophy by* Patricia Churchland (1986), which initiated the already mentioned eliminative approach. Since the late 1980s, the literature on the relationship between philosophy and neuroscience has snowballed. This growth is also characteristic of the Russian academic literature, in which fundamental questions of neuroscience are posed and solved from the positions of neurolinguistics and neuropsychology, which have a strong tradition, and, in recent years, with the active participation of philosophers of consciousness.

Reductionism and Anti-Reductionism in the Philosophy of Neurosciences and Neurophilosophy

Scientific reductionism generally states that "properties, concepts, explanations, or methods from one scientific domain (typically at higher levels of organization) can be deduced from or explained by the properties, concepts,

explanations, or methods from another domain of science (typically at lower levels of organization)" [5]. When applied to neurosciences, reductionism refers to the attitude of reducing the properties, concepts, explanations, and methods of consciousness research to their presumed analogs for the brain. This attitude is widespread among neuroscientists. However, its adherents rarely feel the need to go into its explanation. Clarifying and testing neuroreductionism, therefore, constitutes an essential task for philosophers.

The more careful classification of the varieties of reductionism that have emerged in philosophical work distinguishes ontological, methodological, and epistemic, or explanatory, reductionism. Ontological reductionism in neuroscience means that a) every concrete consciousness is *reduced entirely* to the corresponding specific set of physical entities — brain cells, the entire nervous system, the body, or the body in its interaction with the natural — physical — environment; b) every state or change in consciousness is *identical* to some physical state or change1. Behind ontological neuroreductionism is a more general tendency to further reduce the biological level of being to the chemical and physical standard in modern life sciences, generically referred to as physicalism [5].

Methodological neuroreductionism is the attitude according to which a scientifically sound and fruitful study of consciousness can be conducted only by identifying its physiological correlate and, in the limit, the causal links leading from the brain to consciousness. Methodological reductionism in neuroscience is often referred to as *intertheoretic reduction* following Patricia Churchland [6. P. 278; 7. P. 70]. Such naming allows visualizing methodological reductionism as the absorption of one scientific discipline or theory by another through reducing its concepts, laws, empirical research methods, and presenting facts to its own. In the neurosciences, the most vigorous expansion is carried out by neurobiology, which strengthens its methodological claims by ontological reductionism [8]. However, methodological reductionism is not necessarily accompanied by the ontological one — some programs try not to raise ontological questions. On the other hand, there are also arguments about the relationship and interdependence of these two kinds of reductionism [9]. Methodological neuroreductionism is criticized for *ignoring* significant phenomena instead of reducing them, leaving them without explanation [10; 11].

Epistemic reductionism is a later addition to the ontological and methodological varieties, focusing on the problems of explanation and understanding. The question for is whether a reduced understanding in terms of a new ontology and/or with the help of a new methodology is sufficient, whether there is no loss of meaning, whether it is possible to translate the reduced theory

[1] Instead of identity, many neuroscientists and philosophers prefer to speak of supervenience. The supervenience of consciousness in the brain means that a) it is impossible for the identity of brains to distinguish between concomitant states of consciousness; b) mental changes are impossible without physical changes. Despite its greater conceptual sophistication than the identity thesis, the supervenience thesis still implies ontological reductionism.

into the language of another theory that claims to be more scientifically perfect, how "bridges" for the translation of meanings should be arranged, and so on. The very framing of the questions shows that epistemic reductionism has been formulated from the beginning by skeptics, who tend to answer this set of questions in the negative to criticize and limit the claims of the reductionists. It is only natural that neuroscientific explanations of consciousness in terms of brain structure are particularly controversial, and so the question of the possibility of epistemic reductionism becomes an arena of fundamental and intense debate that requires detailed attention.

In the most general terms, the confrontation is played out between two parties. The first, especially popular among representatives of neurosciences, remains faithful to the conventionally Cartesian or positivist standard of what can be considered an excellent scientific explanation; the second, represented primarily by philosophers, especially philosophers of language, rejects this standard. One of the most prominent and consistent reductionists in the neurosciences was Nobel laureate Francis Crick (1916—2004). In T*he Astonishing Hypothesis: the Scientific Search for the Soul* (1994), he defends ontological and methodological reductionism. Also, he argues that the progress of scientific explanation rests on the progressive reduction of complex phenomena to the properties of their constituent parts:

> "a complex system can be explained by the behavior of its parts and their interactions with each other. For a system with many levels of activity, this process may have to be repeated more than once — that is, the behavior of a particular part may have to be explained by the properties of its parts and their interactions. For example, to understand the brain we may need to know the many interactions of nerve cells with each other; in addition, the behavior of each nerve cell may need explanation in terms of the ions and molecules of which it is composed." [12. P. 7].

One of the most philosophically refined and thorough attempts to carry out a comprehensive reduction of consciousness to the brain was made by John Bickle in his 2003 book *Philosophy and Neuroscience: A Ruthlessly Reductive Account*. The author begins to fulfill his task already at the level of the wording of the title: "explanation" for him is not "explanation" causing "understanding," but rather an "account" — "counting," "reporting." The quantitative representation of states and processes, the progress which took place already at the beginning of the century and has only accelerated since then, gives ground for Bickle's approximationist hopes: "We move closer every day to actually having something that human beings have speculated about for centuries, a purely physical account of behavioral causes" [13. P. xiii]. As a pragmatic justification for "ruthless reductionism," Bickle cites the fact that neuroscientists are "increasingly able to manipulate specific behaviors by intervening directly with these cellular processes and intracellular pathways" [13. P. xiii]

The approach to unraveling the problem of consciousness, according to Bickle, is taking place in the "core field" of neurosciences — cellular and molecular neurobiology. This development goes unnoticed by most philosophers, even the "science-oriented" among them because philosophers have limited their attention to the field of cognitive neuroscience. This discipline has close ties to philosophy, drawing concepts and problems from there from its very inception, which keeps philosophical attention on itself rather than allowing it — and itself — to dissolve into the more fundamental level of neurobiology (and, one could go on, further into the levels of chemistry and, eventually, physics). Unlike philosophers, neurobiologists are well aware of their challenges and opportunities, articulating them even at the level of textbooks. Take, e.g., this quote from the 2023 standard textbook by Nobel laureate Eric Kandel and his co-authors, *Principles of Neural Science*, which has gone through six editions since 1981:

> "This book ... describes how neuroscience attempts to link molecules to the mind — how the proteins responsible for the activity of individual nerve cells are related to the complexity of neural processes. Today, it has become possible to link the molecular dynamics of individual nerve cells with the representations of perceptual and motor acts in the brain and to relate these internal mechanisms to the observed behavior" [14. P. 4].

The notions of "link" or "connect" in the understanding of neuroscientists' approach in the establishment of causal determination from cells and their molecules to the processes of consciousness. Avoiding direct statements about causal determination seems a tribute to a convention, a convention that is regularly attacked. The notion of what an "explanation" should look like, of providing an explanans, revolves around formalized models that demonstrate the ability to predict the course of perceptual, motor acts, and more complex mental processes based on cellular and molecular level data.

The view of science and scientific explanation held by Crick, Kandel, Bickle, and many other scientists is oriented toward the ideal of a "unified science" in which the universe is a hierarchy of objects, where higher-level objects are ontologically reduced to and semantically explained by reference to lower-level objects. This ideal has its origins in ancient atomism. It was especially firmly established in the New Age worldview by metaphysical materialists such as Gassendi and Hobbes in the 17th century and La Mettrie and d'Holbach in the 18th century, and by methodologists of "clarity and distinctness" such as Descartes and in the 20th century found expression in the "standard conception of science" of logical positivism. In turn, the positivist approach to explanation first proposed to reduce it to sensory data (Carnap gives an example in *The Logical Structure of the World*, 1928), then to the level of physical entities (Carnap in *The Unity of Science*, 1934).

The problem with epistemic reductionism, according to its critics, is that, having internalized the "standard conception of science," it fails to consider its difficulties, above all those revealed by the philosophy of language since the mid-20th century. According to critics, adherence to the reductionist standards of

"understanding the understanding" itself has no scientific basis and is at best justified metaphysically-or not at all. It is in the territory of metaphysics, logic, and linguistics that the lines of defense against reductionism lie.

One notable attempt to build such a defense is in the abovementioned book by neuroscientist Bennett and philosopher Hacker. The flag of the philosophy of ordinary language and "a spirit hovers over its arguments: the spirit of Ludwig Wittgenstein" [3. P. 12], one of the prominent experts on the legacy of which is Hacker. Wittgenstein laid the foundations of modern cognitive neuroscience, which aims to "to elucidate the conceptual relations between the behavioral and the 'inner,' 'mental' or 'psychological.' It has to account for the conceptual structures that inform the asymmetries between the first-person utterance and the third-person description of 'experience' or 'states of consciousness.' " [3. P. 12] The reductionist program is an elaborate attempt to reduce the properties of human experience to a language of observation accessible to the outside researcher. This attempt is based on two errors. The first is what the authors call the *mereological fallacy* of reducing the properties of the whole to the properties of the parts, a well-known anti-reductionist move. The second error is linguistic or categorical and consists in treating the extra-scientific expressions on which neuroscientific theories rely as internal parts of those theories. If neuroscientists rebuke the bulk of philosophers for not knowing how the cellular and molecular substrate of consciousness works, then the philosophers' counter-rebuke imputes to the reductionist-minded neuroscientists a lack of understanding of how the human language in which scientists must formulate their theories works.

Bennett and Hacker identify within cognitive neuroscience a specific and central project of inventorying and clarifying the section of everyday language devoted to describing mental states. This language, in accordance with the Wittgensteinian paradigm, does not lend itself to reduction to scientific language, be it the language of molecular neurobiology or physics. If it deserves the disparaging name "folk psychology," it is only in its unclarified form. The clarification consists of analyzing the contexts of the use of words belonging to the mental sphere, establishing semantic links between them, and identifying keywords among them through reference to which the others are defined. These keywords form a conceptual schema or network that allows us to grasp and understand the experience encountered by the bearer of the kind of consciousness we know as humans. There is an evident similarity of such a program to Peter Strawson's project of descriptive metaphysics, which aims to reveal the conceptual structure of experience that accommodates and organizes the totality of meaning. Like Strawson, Bennett, and Hacker contrast the descriptive approach with the revisionary one that seeks to "improve" or "fix" the natural structure of the language we use to discuss the mental. Attempts by scientists and "scientifically minded" philosophers to bring "clarity and distinctness" through reduction to mere names and propositions when carried out sequentially have resulted in a loss of meaning

and a representation of reality in terms of the physicalist "ontological desert" of early Quine [15].

This is another aspect that critics of reductionism point out — the impossibility of constructing the language of science, including and above all the science of life, and especially of conscious life, without metaphors and other figures of speech, far from the essential positivist minimum of indicative definitions and logical procedures. Attention to metaphors also has roots in the post-Wittgensteinian turn to everyday language. Since the 1950s, metaphors have been the subject of research in hermeneutics (Hans-Georg Gadamer, Paul Ricœur, et al.), where they were regarded as the meaning-generating level of language, from which there is an "emanation" of meaning, which is further partially grasped and specified in concepts. The cognitive significance of metaphors and other figures is gaining recognition in cognitive linguistics (Lakoff et al.). Within the program of the history of concepts and historical semantics, Hans Blumenberg elaborates on the defining role of metaphors in science [16], a role also pointed out by recognized theorists of science such as Kuhn [17]. Comparatively recently, the study of metaphors in the life sciences has also become a particular field.

For an example of the latter, let us turn to the work of Andrew Reynolds [18, 19]. Reynolds proceeds from the social, linguistic, and communicative nature of science, for which the goal is understanding — in the sense of "understanding," not in the sense of "accounting" — and the formation of communicative communities of action around some understanding that go beyond narrow groups of professionals. Metaphors as "A figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable," are one of the main tools for giving meaning to the incomprehensible through borrowing meaning from the comprehensible [19. P. 2].

The life sciences have relied on "metaphorogenesis" since their very emergence. For instance, the word *cell* was first used by Robert Hooke in 1665 when describing the results of microscope observation of cork tree tissues, which reminded him of bee honeycombs — which, Reynolds continues, were probably named so because of their resemblance to monks' cells and prison cells. Along with cells, Hooke uses many other words: *bladders, boxes, bubbles, caverns, chambers*, and *pores* [19. P. 69]. It turns out that cellular neuroscience, which claims to understand and explain consciousness and, consequently, the language associated with it, has a metaphor in its fundamental categories and in its very name, and it is only one of many possible ones. Reynolds does similar work for metaphors that endow different-level parts of an organism with an agency, interpreting them as *mechanisms, teams, communities, colonies, factories, ensembles, ecosystems*, genetic metaphors of *code, program, information*, etc. His verdict is that the meaning of the language of the life sciences (or languages, if we take a non-reductionist stance here too) — and in particular neurosciences — is derived from the meanings of everyday language, and this fuzzy and motley basis is not amenable to revision and reduction.

The question of the limits of the possibility of reduction among the neurosciences and in their relations with other disciplines, including philosophy, is only part of the field of discussion. However, it is one of the central ones, and the way in which it is resolved has extensive implications, determining the nature of the disciplines' relationship. On the one hand, reduction was and remains "one of the basic operations of many specific methods, as well as techniques of everyday cognition" [20]. On the other hand, the neurosciences *de facto* use and obviously need a plurality of ways to conceptualize their achievements, relying on metaphors in the very foundations of their ontology ("cell") and epistemology ("reductio-reduction").

Comments on Publications

Philosophy continues to be a rich source of meanings that may interest neurosciences as it provides an integral explanation of different levels of reality. Common to the contributions in this issue is the desire to relate philosophical concepts, their ontologies, and ways of understanding to the development of neurosciences. N. Atanasova's article explores the refraction of ideologies in mediated reality and how the *reified social world* determines subjective perceptions. The *camera obscura* metaphor, used in sign attempts to explain the impact of ideologies (Marx) and visually perceived objects (Descartes) on consciousness, serves to bring the understanding of social and cognitive processes closer together. A. Miliatzidou uses Levinas's concept of Self-friend relations to clarify the impact of digitalization, in particular the spread of social networks, on the state of Self and cognitive processes, preparing a step towards understanding the accompanying neurotransformations. A.S. Adzhemov and A.B. Denisova address the problem of the influence of the way of organizing sensory perception and emotional reactions on data processing and decision-making as applied to human subjects and to artificial intelligent systems. E. Koumparoudis' article raises the question of commonality in the cognitive organization of humans and other animals and the identification of neurostructures providing the observed commonality. V.N. Knyazev and G.V. Parshikova analyze the landscape of modern discussions around the hypothesis of the generation of protomental states at the quantum-molecular level. A.A. Lagunov and S.Yu. Ivanova study the relations between the established disciplines that form the neuroscience complex and the recently appeared neurotheology, criticizing at the same time the deterministic tendency in the methodology of the latter. Yu.V. Sokolova advocates interdisciplinary approaches to the study of consciousness and the expansion of the range of sciences that study consciousness and the brain. V.A. Tsvyk, I.V. Tsvyk, and T.P. Pavlova analyze the social and ethical consequences of the emergence of a "human-machine technosubject" in the course of the development of innovative technologies derived from brain research and the construction of artificial intelligence. E.V. Chapny evaluates the possibilities of a body-oriented approach to comprehending the complex "body-consciousness-technology-social

environment." Not belonging to a single research paradigm, using different disciplinary languages, the authors offer a set of perspectives from the vast array of those that form the relationship between philosophy and neurosciences today.

References / Список литературы

[1] Bickle J, Landreth A, Mandik P. *The Philosophy of Neuroscience*. In: Zalta EN, editor. *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University; 2019. Available from: https://plato.stanford.edu/archives/fall2019/entries/neuroscience/ (accessed: 14.02.2020).

[2] Finger S. *An Ancient Egyptian Physician: The Dawn of Neurology. In: Finger S, editor. Minds Behind the Brain: A history of the pioneers and their discoveries*. Oxford University Press; 2005. Available from: https://doi.org/10.1093/acprof:oso/9780195181821.003.0002 (accessed: 05.10.2023).

[3] Bennett MR, Hacker PMS. *Philosophical Foundations of Neuroscience*. John Wiley & Sons; 2021.

[4] Pecere P. *Soul, Mind and Brain from Descartes to Cognitive Science: A Critical History.* Springer Nature; 2020.

[5] Brigandt I, Love A. Reductionism in Biology. In: Zalta EN, Nodelman U, editors. The *Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University; 2023. Available from: https://plato.stanford.edu/archives/sum2023/entries/reduction-biology/ (accessed: 05.10.2023).

[6] Churchland PS. *Neurophilosophy: Toward a Unified Science of the Mind-brain*. MIT Press; 1986.

[7] Chemero A, Heyser CJ. *Methodology and Reduction in the Behavioral Neurosciences: Object Exploration as a Case Study*. In: Bickle J, editor. *The Oxford Handbook of Philosophy and Neuroscience.* Oxford University Press; 2009. P. 68–90. Available from: https://doi.org/10.1093/oxfordhb/9780195304787.003.0004 (accessed: 05.10.2023).

[8] Parker D. Neurobiological reduction: From cellular explanations of behavior to interventions. *Front Psychol*. Available from: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.987101 (accessed: 05.10.2023).

[9] Sachse C. Reductionism in the Philosophy of Science. In: Reductionism in the Philosophy of Science. *De Gruyte*. Available from: https://www.degruyter.com/document/doi/10.1515/9783110323320/html (accessed: 05.10.2023).

[10] Wimsatt WC. Reductionism and its heuristics: Making methodological reductionism honest. *Synthese*. 2006;151(3):445–475.

[11] Wimsatt WC. *Re-Engineering Philosophy for Limited Beings: Piecewise Approximations to Reality*. Harvard University Press; 2007.

[12] Crick F. *The Astonishing Hypothesis: The Scientific Search for the Soul.* Simon and Schuster; 1994.

[13] Bickle J. *Philosophy and Neuroscience*: *A Ruthlessly Reductive Account*. Springer Netherlands; 2003.

[14] Kandel ER, Koester JD, Mack SH, Siegelbaum SA. *Principles of Neural Science, Sixth Edition*. McGraw Hill Professional; 2021.

[15] Wimsatt WC. The Ontology of Complex Systems: Levels of Organization, Perspectives, and Causal Thickets. In: *Canadian Journal of Philosophy, Supplementary Volume*. 1994;(20):207–274.

[16] Blumenberg H. *Paradigms for a Metaphorology*. Cornell University Press; 2011.

[17] Kuhn TS. *Metaphor in science*. In: Ortony A, editor. Metaphor and Thought. 2nd ed. Cambridge University Press; 1993. Available from: https://www.cambridge.org/core/books/metaphor-and-thought/metaphor-in-science/291E8A7ADF9A427260C5C6C8653A1F1F (accessed: 11.09.2023).
[18] Reynolds AS. *The Third Lens: Metaphor and the Creation of Modern Cell Biology*. Chicago: University of Chicago Press; 2018.
[19] Reynolds AS. *Understanding Metaphors in the Life Sciences*. Cambridge: Cambridge University Press; 2022.
[20] Mikeshina LA. Reductionism as a Problem of Philosophy of Science and Epistemology. *Epistemology and Philosophy of Science*. 2013;37(3):5–13. (In Russian).
Микешина Л.А. Редукционизм как проблема философии науки и эпистемологии // Эпистемология и философия науки. 2013. Т. 37. № 3. С. 5–13.

About the author:
Chaly Vadim A. — PhD, Professor, Faculty of Philosophy, Lomonosov Moscow State University, Moscow, Russia; Senior Research Fellow, Academia Kantiana, Immanuel Kant Baltic Federal University, Kaliningrad, Russia (e-mail: vadim.chaly@gmail.com). ORCID: 0000-0001-7570-3382

Сведения об авторе:
Чалый Вадим Александрович — доктор философских наук, профессор философского факультета Московского государственного университета имени М.В. Ломоносова, Москва; старший научный сотрудник Академии Кантиана Балтийского федерального университета, Калининград, Россия (e-mail: vadim.chaly@gmail.com). ORCID: 0000-0001-7570-3382