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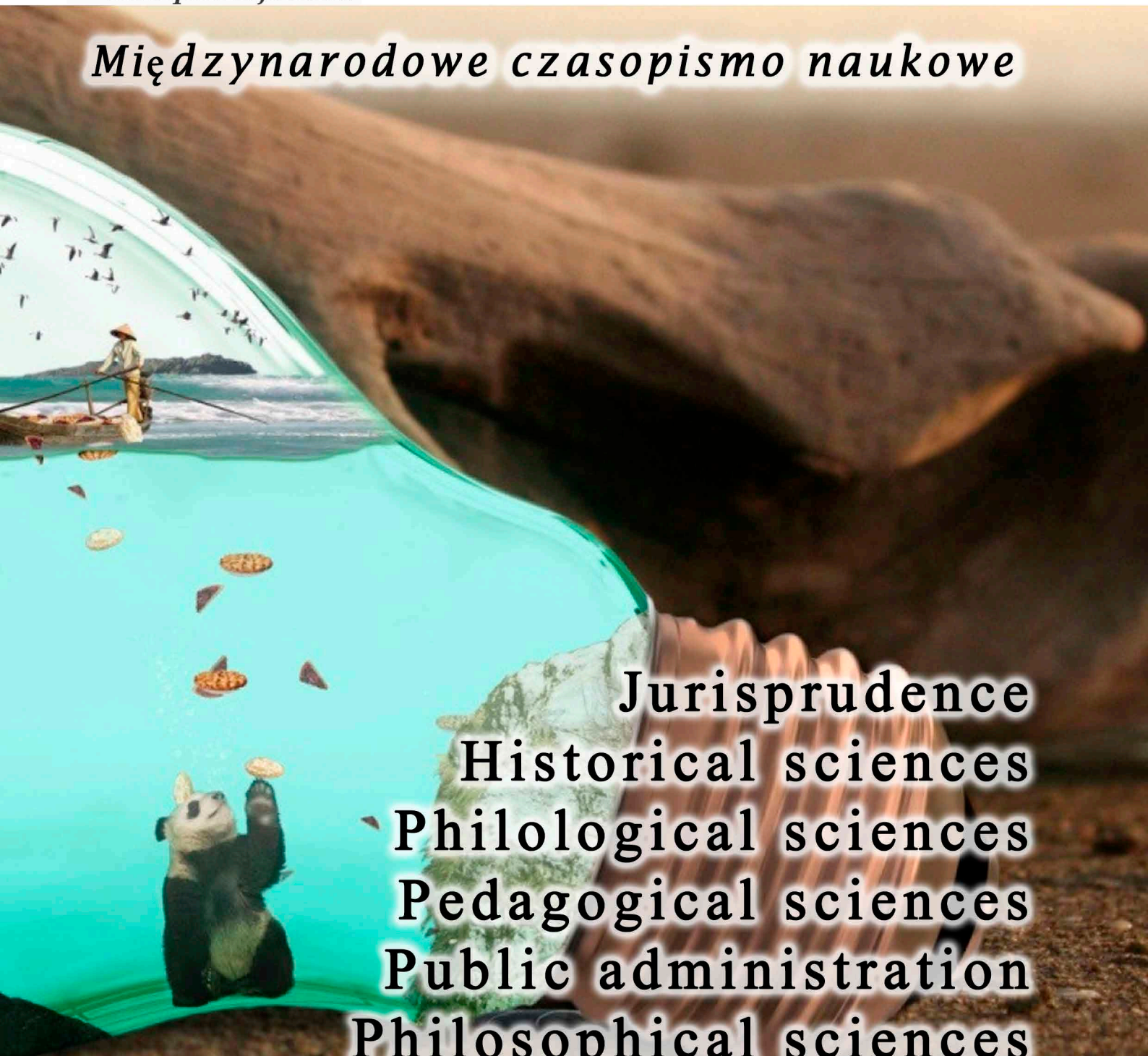

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время необходимо как функция для определённых математических действий, описывающих те или иные процессы, происходящие в природе. Отдельно существующее «время» - это плод фантазии отдельных физиков, принявших желаемое за действительное ради доказательства жизненности Общей Теории Относительности.

Второй «СТОЛП» Теории относительности – высшая по величине, постоянная по значению – скорость света в вакууме «с».

Наблюдения Э. Хаббла и В. Слайфера, а также многочисленные наблюдения и опыты учёных разных стран показывают, что значение скорости света в вакууме принятая равной 299 792 458 м/с не является величиной постоянной, а фотон – это материальная частица, а не квант электромагнитной энергии, как утверждает ОТО. **Но «время», как самостоятельный фактор физики и «высшее, неизменное значение скорости света в вакууме» это те две основные опоры, на которых стоит ОТО.**

Из этого следует, что выводы ОТО (о расширяющейся Вселенной и вселенском взрыве) не актуальны! А, может быть правы те, кто считает ОТО - шарлатанством?!

Я считаю, что в своей работе «МИР» мне удалось довольно убедительно доказать круговорот материи в природе. А это значит, что никакого вселенского взрыва быть не могло.

Заключение

У материи существуют события, вследствие физических свойств материи, следующие своим чередом. Каждое событие происходящее с материей имеет свою длительность. Сумма длительности череды событий образует «время».

Но время не существует как явление. Оно существует как понятие суммы явлений. Время – это чисто мыслительный образ. Поэтому-то его можно мысленно представить как угодно и чем угодно. Возможно, что это и явилось причиной материализации времени (самостоятельного движения времени в пространстве) физиками ОТО, что, в свою очередь, послужило причиной решения о возникновения Вселенной из точки (вселенского взрыва) и расширении Вселенной.

ВСЕЛЕННАЯ БЕСКОНЕЧНА, ОНА СУЩЕСТВОВАЛА СУЩЕСТВУЕТ И БУДЕТ СУЩЕСТВОВАТЬ ВСЕГДА! ДЛЯ ВСЕЛЕННОЙ ВРЕМЕНИ НЕТ ЕСТЬ ТОЛЬКО МАТЕРИЯ, ОСУЩЕСТВЛЯЮЩАЯ СВОЁ БЫТИЕ В МИРОВОМ ПРОСТРАНСТВЕ.

UDC: 167.7

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REVOLUTIONARY TRANSFORMATIONS IN MODERN SCIENCE: PHILOSOPHICAL ANALYSIS

Abstract.

Revolutionary changes in science from mid-19th century, when revision of mechanistic picture of the world began, up to current exploration of self-organization phenomenon by science initiating formation of post-non-classical picture of the world, have been analyzed in the paper. Revolutionary transformations of science, if considered in methodological way, are presented as significant reconsideration of theory and experience ratio and their place in scientific research cycle. Using historical-genetic and hermeneutic methods, it has been found out that standards of positivist scientific research known in the 20th century have become a universal way of normative combination of speculative and empirical cognitive levels, external worldview and internal subject sources and revolutionary and cumulative stages of scientific cognition. It has been defined that growing role of methodological principles in non-classical structure of scientific research cycle is associated with the need to create and select alternative elements of scientific knowledge of non-empirical nature, in post-non-classical – with their ontological activity in relation to objects in constant motion and self-developing. Depending on implementation of semiotic and culturological programs in modern science philosophy, prospect of shifting classical model of scientific theory by including its structure of applied and communicative values to purely cognitive relations as more fundamental.

Keywords: *scientific revolution, methodological principle, value, non-classical science, post-non-classical science, self-developing objects.*

Relevance of the declared topic is driven by interception of revolutionary role by axiological, communicative and other socio-cultural factors of cognition in the development of modern science, while previous revolutions in science were primarily considered methodological ones. Unlike the first one, subsequent large-scale revolutions in science were not limited to application of one leading discipline as they progressed causing «chain reaction» of drastic changes throughout science and leading to modern scientific picture of the world and guidelines to study it. However, despite exploration and even habituation, *structure* of these

changes is perceived ambiguously (differences occur even in counting and naming scientific revolutions). On the one hand, it is fully seen only in some branches of science or even only in *physics* through new research objects, problems, thinking style, language, mathematical formalism, experiment arrangement. Although compared with the 17th and 18th centuries its laws no longer claim to be principles of cosmic harmony being the center of all existential properties, namely theory of relativity discrediting privileged frame of reference and quantum mechanics asserting invisible properties-relations and statistical structure of objects is considered to be the primary reason for *crisis* classical concepts of cognition object as an external («Archimedean») observer and of cognition objects as completely natural items independent of conceptual means and experimental operations.

On the other hand, disciplinary genealogy of this crisis in historical-scientific and philosophical literature is constantly branching out (works by A. Barakk, S.G. Brash, V.V. Ilyin, V.V. Kazyutinsky, I.B. Cohen, V.I. Kuptsov, I.O. Orlov, N.I. Rodny, T.B. Romanovska, V.S. Stepin). Thus, the beginning of non-classical style of thinking is now associated with *descriptive means* of criminal and commercial statistics, tracing their translation to statistical biology and only later – to statistical physics, where they are given a revolutionary role in undermining the basic worldview of mechanicalism regarding external spatial concentration, objective *essence* of the physical body and its replacement by a «surrogate» of instrumentalist, verificationist, metric methods, structural rules of transformation.

The **issue** is that most famous concepts of scientific knowledge dynamics being committed to material of the first revolution in science limit the structure of drastic changes at the most general level of philosophical reflection to a monodisciplinary approach or generally subordinate knowledge *content-related* gaps and cumulation to *micro*sociological or *macro*sociological ones. This paper is aimed at eliminating this discrepancy and establishing dialectic of cognitive and non-cognitive relations in the course of reconstruction of causes and consequences of revolutions in modern science.

The revolution preconditions can be divided into *remote* (mid-19th century), when extrapolation of program of experimental and mathematical natural sciences to descriptive fields of physics, chemistry, botany, zoology, geology, ethnography revealed first difficulties, and *direct* (turn of the 19th-20th centuries), when this extrapolation exhausted itself. The revolution's «first robins» represented by A. Lavoisier, J. Dalton, A. Avogadro, I. Kant, P.-S. Laplace, Ch. Darwin, M. Schleiden, T. Schwann, M. Faraday, J. Maxwell, J. von Mayer, G. Mendel «made nests» as non-mechanical (thermodynamic, electrodynamics, evolutionary) pictures of the world on the tree of classical cognitive guidelines. Although substantive grounds for such distinction were supported by setting up special scientific societies (along with training staff and theoretical planning of technical inventions), principle of *substantiality* (immutability of atoms, molecules, waves, species, cells) allowed maintaining links with Newtonian image of scientific activity. According to statistical theory of heat, theory of electromagnetic field, evolutionary theory at the level of *scientific* reflection and «encyclopedic law» by A. Comte, classification of the sciences by H. Spencer «general picture of natural forms of matter in motion» by F. Engels – at *philosophical* level, nothing prevented a scientist to count in his search on general scientific continuity and completion of truth. For instance, Darwin's theory, regardless of all its revolutionary nature, corresponded to usual insight into of discrete matter with attractive and repulsive properties, which, based on laws of classical mechanics, continuously evolves towards highly organized expediency.

Serious crisis that, according to A. Poincaré [15], branched out in violation of classical physical principles of conservation (mass, energy, momentum), was marked by antimechanistic *heterogeneity* and Kantian *phenomenalism*. First, scientists began studying objects of new – *mega*- or *micro*- – scale, disproportionate to *macro*-conditions of human senses and experimental equipment. Second, objects of the new type under study revealed significant instability with internal uncontrolled processes. Thus a need for special functions, such as «entropy», «wave function», «ideal types», which would «translate» contradictory and irregular events of uncontrolled description level into patterns terms appeared. For instance, in molecular-kinetic model of gas, the well-known «temperature» as the amount of heat available for visual perception and measurement is detected only by an *external* parameter to be calculated and predicted in view of a theoretical *model* relating temperature as average velocity of molecules to other internal parameters of the gas system. Another example is quantum theory, which should also combine concepts of two classes of different logical levels: external «directly observable» individual stochastic quantities (such as coordinates) *and* internal generalized quantum numbers (such as spin).

As a result, due to *significant* mediation of access to objects and their poor idealization and generalization, theoretical and empirical language actual *split*, which broke classical cycle of their mutual commitment: various «forces» (gravity, acceleration, chemical affinity), «field», «fluids», «elementary currents», «atoms», «electrons» or «ether» are postulated and analyzed only at theoretical level, while empirical studies establish rational merits of *manifestation* of these theoretical objects' properties. «‹…› Modern physics, which combined space and microcosm, leaves nothing that could be considered "extraphysical" (more broadly – "extrascientific") essence of the world. Never before has it been shown so clearly as in modern science that substance is inseparable from its own manifestations» [11, p. 38].

Thus, science methodology has overcome Newton's prohibition to «invent» *non*-empirical hypotheses justifying their possibility to become mathematical models and thus exposing to the issue of their alternativeness (phenomenological thermodynamics / kinetic theory of thermal processes, Ampere's and Weber's electrodynamics / Faraday's and Maxwell's electrody-

namics etc.). «The aim is not to produce bold hypotheses as to the essence of matter, or to explain the movement of a body from that of molecules, but to present equations which, free from hypotheses, are as far as possible true and quantitatively correct correspondents of the phenomenal world, careless of the essence of things and forces» [4, p. 109].

An influential precedent was set yet in early to mid-19th century in *geometry* (N.I.Lobachevsky, B. Riemann, J. Bolyai, A. Cayley, F. Klein etc.), which previously fed classical principles of grounds *fundamentalism* and discoveries *cumulativism*. Geometric systems, such as *elliptical* geometry of B. Riemann, where the 5th postulate of the Euclidean system and the idea of planes is modified, gave all mathematics, and mathematized natural science afterwards, a sample of scientific knowledge with intermediate status between apriority of classical rationalism and aposteriority of empiricism. If empirical generalizations reveal irrevocable probability, theoretical statements will receive a range of syntactic variations for further testing of the laws created by scientists already as professional conventions. In addition to a certain test of naive-contemplative realism, this dilution of truth *and* axiom undermined guarantees of provability and inconsistency of *conclusions* with axioms, as was previously assumed by exemplary deductive-axiomatic method.

This courage was fueled by a number of preconditions that depended not so much on new types of objects of science as on new types of *self-awareness* of scientists:

- *personalism* and *modernism*, which sanctioned freedom from generalizing standards and «naturalness» in representation of reality in favor of the original self-expression in conditional and provocative forms;

- *psychologism* and *phenomenology*, which manifested primacy of spontaneous subjectivity and articulated it in the intersubjective mechanisms of *information* symbolization (principles of symmetry, principles of group theory, logical-algebraic principles) and codification and relativistic procedures for its transformation (variation, compositing, aberration, equivalence);

- *pragmatism*, which broke the link between industry goals and means and subordinated representation truth to its practical capacity, and the goals of spiritual improvement – to success criterion;

- *nihilism*, which rejected traditional spiritual foundations of existence as ostentatious teleologies in favor of worldly absurdity, occasionality, blind experiment, unconditional exposure, and cynical Epicureanism.

In an attempt to combine these subjectivist sentiments of the culture of that time with objective-true criteria of progressive philosophy and science, the methodologist of the theory of relativity and quantum mechanics H. Reichenbach proclaimed structural *a*symmetry of *research process:* its content and methods should be divided into psychological «context of *discovery*» (imaginative intuition represented by psychology of creativity and evaluated by ideological preferences) and logical «context of *justification*» (conclusions deduction or statements tautology guided by statements logic). On the one hand, this distinction demonstrates *pre*-revolutionary methodological opposition of humanitarian understanding and natural explanation, and on the other – how methodological relativity of non-classical ontology undermined confidence in the ideal of complete induction as a method of constructing theories or hypotheses. «An act of discovery is not subject to logical analysis. It is not a matter of logic to explain scientific discoveries; it can do nothing but analyze the relationship between facts and theory ‹…› I introduce terms "*discovery* context" and "*justification* context" to make such a distinction» [16, p. 6-7]. Under the conditions of marginal mathematization of science, the first notion fails to fall into its corpus, while the second creates the lion's share of *problematics* of the dominant post-revolutionary *neo-positivist* philosophy of science – logical calculus options formalization for analysis of relation of theoretical knowledge (reduction, contradiction) and its empirical verification.

In this way, classical «rules of problem solving» are transformed into non-classical «rules of evaluation» and are applied only to verbal *results* of cognitive actions (mostly ready-made theories) as «demarcation criteria» (in neo-positivism), or «scientific rationality» (in post-positivism) [12, p. 102-103].

Thus, in comparison with classical universal method of cognition, empirical data analysis and theoretical positions synthesis move from the starting to the intermediate points in scientific research cycle. In particular, non-classical theoretical *model* not only pre-*reflects* the hidden reality but also *constitutes* it. For instance, according to quantum-mechanical principle of corpuscular-wave duality, representation of the same micro-object as a particle or wave dictates different ways of its experimental measurement (in bubble chamber or diffraction-grating) to be processed by different conceptual-mathematical devices (matrix mechanics W. Heisenberg or wave mechanics E. Schrödinger). Moreover, alternative representations explaining the same phenomena as different objects do not necessarily have to reject and linearly change each other, as it was voiced in classical methodology of cumulativism. Material experiment is considered as statistical – due to relativity of the frame of reference or interaction with the device – harmonization of different ways of description with invariants of the observed reality. Thus, ontological and methodological heterogeneity of non-classicism occur in predominance of models' syntactic consistency over their semantic correspondence, and thus – in mediations, which classical hypothetical-deductive methodology of Newtonianism did not take into account:

a) hypothetical essence is formulated only through its connotations, the set of which can be neither divided nor covered by one theory, so the hypothesis (model) will remain an alternative [6, p. 274-275];

b) a thing is percieved only through its relations, the set of which can be neither divided nor covered by one experiment, so testing a hypothesis (model) will remain probabilistic-statistical [13, p. 357-358].

In classical notion of scientific *progress*, methodical manipulation with descriptive variables based on a

set of factual statements must turn into theoretical explanation promising unlimited predictability and mastery of the subject. However, search for a unified theory of fundamental interactions, on the one hand, and «hidden nearest variable» of self-identical ontology, on the other, inspired by elimination of theoretical alternatives, only gave rise to non-classical problem of *redundancy* of rationality criteria. If in the second half of the 20th century this forces philosophical reflection to look for cognition norms at a more general level of *extra*-logical analysis (*incommensurability argument*), and scientific one – to focus on intersubjective potential of instrumental representation methods – «mathematical hypotheses», «synthetic forms», «propositional statement».

By implementing antimetaphysical program of positivism, these «descriptions» shifted cognitive priorities from the object to the method, from the explanatory function of a theory to predictive ones, from causal determinism to the probabilistic ersatz of causality – a holistic range of possible values. At the same time, for figurative understanding of probability, natural science assimilated the concept of heterogeneous levels of determination from philosophical irrationalism and neo-Kantianism, reflected by N. Bohr as model ersatz of analytical explanation of the scientific theory. «Unlike the situation in earlier periods, clarity does not reside in simplification and reduction to a single, directly comprehensible model, but in the exhaustive overlay of different descriptions that incorporate apparently contradictory notions» [8, p. 258]. In ontological aspect, this meant attributing non-causal factor to internal spontaneous properties of atomic objects, now truly independent but consistent in updating their capabilities by the general conditions of the system («disposition field»).

Thus, defect of one-sidedness and scientific explanation alternativeness is no longer removed by reaching the status of reproducibility when theoretical *essence* is manifested in empirical *existence*. The latter has ceased to be a happy partial case of a natural essence, which is freed from external complicating circumstances by scientific efforts. Truth of existence, on the contrary, is now mediated by abstract mathematical models forming the basis for *non*-classical scientific rationality: «thinking here reproduces an object as if included into human activity and builds images of the object correlating them with ideas about historically formed means of its development» [19, p. 164].

Prospect of their similarity, symmetry, systematization and regularity was touched upon in «The Unity of the Human Mind» *project*, a multifunctional scientific methodology and picture of the world by pioneers in philosophy of science (A. Comte, J.St. Mill, W. Whewell). Although it turned impossible to implement it as the desired normative structure, fully explicated in logical and mathematical terms, as later proved by K. Gödel, the «discovery context» of non-classical science was supported, and the «justification context» became burdened by methodological *principles* for evaluating competing models. One of the first set of such principles was provided by H.R. Hertz in his «The Principles of Mechanics Presented in a New Form» (1894) – logical capacity, ability to anticipate, coverage of maximum number of the object's significant relationships, minimization of empty or redundant relationships. Afterwards, by efforts of E. Mach, H. Poincaré, F. Dyson, R. Carnap, H. Morgenthau, E. Noether, N. Bohr, M. Bunge, B.G. Kuznetsov they are differentiated into principles of *including* models in the set of possible solutions (syntactic and semantic rules, metascientific requirements…) and *choosing* between them (formalization degree, unity and simplicity, originality, explanatory power regarding laws, predictive power regarding phenomena, connection depth regarding essential values, consistency with worldview…). Although constancy of these lists and interpretation unambiguity remain far from sternness, some of them have earned author's fame and *universality* – principle of consistency with the thinking style of the era (W. Pauli, N. Bohr), principle of craziness of ideas (N. Bohr), complementarity principle (N. Bohr) etc. For instance, in biology, complementarity principle dictates combination of a number of approaches (of structural and historical, of reductionist and synthetic, of functional-target and probabilistic-statistical, of descriptive-classification and explanatory-nomothetic, of organismic and population) indicating relevance of *interdisciplinary* research on living things.

Since the 1970s, non-classical science, which developed at the turn of the 19th and 20th centuries, has been replaced by another revision of such classical characteristics as objectivity and truth: *post*-non-classical type of cognitive activity correlates knowledge about an object not only with technical and theoretical means, but also with the target guidelines of the subject of cognition. To some extent, this is a consequence of the so-called «scientific and technological revolution»: if the industrial revolution of the 19th century meant such improvement in material production, when «hands are replaced by engines», the current one means «replacement of controlling mind by machine» for ordinary work functions. In economic terms, this leads to the largest (compared to raw materials or capital) share of machine technology cost in the final product cost. Moreover, due to relative independence of scientific knowledge development, rate of its growth outpaces the rate of production renovation and return on investment, making more profitable ownership not of material means of production, but of scientific and information production. Hence *applied science* and not fundamental one is predominantly funded by transnational corporations and not by state. The scale of its experiment is equal to scale of industrial production, overturning their traditional relationship as means and goals: in particular, expediency of human survival and their environment subordinates scientific research cycle and high knowledge intensity of production transfers here scientific priority of innovation over replication. The same applies to intangible production.

Referents of post-non-classical science, first described by non-classical thermodynamics as «complex» objects (dissipative structures, fractals, vacuum fluctuations, artificial intelligence systems, medical

and biological, ecosystems etc.), are open, nonequilibrium, *systems* capable, unlike classical thermodynamic objects, of *neg*entropic *self*-organization (i.e. their energy is not dissipated but spent on spontaneous emergence of new structures). As it soon became clear, their representation required combination of analytical procedures of *mechanistic description*, as it is considered by mathematical physics, and *subjective historicism*, traditionally inherent in biology and the humanities. «‹…› In contrast to small systems, such objects are characterized by level organization, presence of relatively autonomous and variable subsystems, mass stochastic interaction of their elements, existence of a management level and feedback to ensure system integrity» [18, p. 360].

Their existence looks like permanent *formation* with alternating stages of order *and* chaos, establishment and destruction of nomological structure. Only the first of these stages, if taken isolated, can be mastered by cognitive means of *classical* rationality as an epistemological aspect of classical determinism. *Mathematical* models of chaos consist of nonlinear equations and are reproduced by the theory of dynamic chaos (A.N. Kolmogorov, D.V. Anosov, Y.G. Sinai, G.M. Zaslavsky, B.V. Chirikov). One of the most famous such *models* was discovered in 1963 by an American meteorologist E. Lorenz due to complications of meteorological forecasts and was later named «Strange Attractor» by D. Ruelle. It describes motion whose *trajectories* form a graph of two glued spiral strips corresponding to two divergent flows without intersections at repetitions («non-periodicity») in the specific projection of a three-dimensional phase space. Due to sensitivity to initial conditions, a point characterizing the system state at a certain moment accidentally jumps between the left and right strips, showing their distancing over time.

This model developed on the material of turbulent flows in the atmosphere soon received applications in hydrodynamics, kinetics of chemical reactions, laser physics, etc., where objects with chaotic behavior were also detected. Moreover, examples of J. Maxwell and H. Poincaré with classical deterministic systems have acquired new significance in this regard while being in unstable state. In dynamic aspect, «strange attractor» demonstrates how small initial deviations can lead to large consequences; in structural one – demonstrates large-scale invariance: as the scale decreases, each strip splits into two, so even at smaller examination, they look the same every time as at large one (structure of a Cantor set, fractality).

Ontological interpretations and generalizations of self-organization phenomena combining thermodynamic models and evolutionary style of thinking, are now increasingly united in «*synergetics*» term (H. Haken, I. Prigogine). In general, formation of a self-organized system does not so much generate or sustain, as participates in hierarchical causing intense quantities. In methodological terms, this is expressed in *environmental friendliness* principle – a property of permanent selective exchange of the system with the environment, when adaptive behavior of the system structure and components to dynamics of environmental conditions appears as a cycle providing alternative trajectories of systems development and co-evolution.

Essential role in such adaptation is played by *fluctuations* – spontaneity micro-foci (M. Smoluchowski, V.I. Arnold, R. Thom, G. Nicolis), in which certain events can escape dictates of the law and even acquire equal «first impulse» status, inspiring chaotic stage of formation and emergence of new structures with appropriate trajectories. It was previously known that very existence of complexity («degrees of freedom») in *macro*system implies random *micro*scopic deviations of the observed physical quantities from average values, which can usually be mastered in the form of dispersion relations. However, now it turned out that individual changes can accumulate up to qualitative changes («phase transitions») in non-equilibrium processes: in the critical area near instability, the system's behavior becomes coherent and accompanied by «long-wave» macroscopic fluctuations. Such *occasionality* violates classical notions of law as continuous substantial action of forces initiated by initial conditions of the environment and subject to reproduction in linear equations from transcendent subject point of view. «‹…› Even if nonlinear processes can be described by nonlinear equations, there is no analytical solution that could claim theoretical representation of a single entity. As for numerical solutions, they show that we are not dealing with different manifestations of the same essence, but with fundamentally different phenomena, for instance, with dynamically stable dissipative structures (for some values of control parameters) and with a strange attractor for others» [5, p. 83].

Thus, «system objects» based on physical chemistry, represented by «*nonlinear*» mathematical theories, force us to reconsider methods and types of determination of regular motion of measured properties in favor of *in*determinist categories as means of scientific representation of reality. «In particular, principle of superposition is not fulfilled in nonlinear systems, resonances are qualitatively changed, there are special nonlinear effects of dynamics absent at linear systems. This leads to behavior of nonlinear systems not being described by polar categories, so there is a need to introduce synthetic *concepts* uniting the dichotomy parts – deterministic chaos (ordered disorder; necessary, regular randomness); self-organization (randomly arising order); fractality (discrete continuity, integral partiality) etc.» [1, p. 31].

Interpretation of natural objects as those having lost structural *stability* – source of objective values and absolute foundations of classical rationality – coincides with current ideas about the transfer of philosophical reflection on science from post-positivist «genesis» to postmodern «*deconstruction*». For instance, basic categories such as «space» / «chaos», «grounds» / «conclusion», «subject» / «object», «author» / «work», etc. are exposed as *oppositions* forming discourse, administering the space of scientific search and shaping particular values and prejudices as scientific descriptions and explanations. Thus, the theorist of sociology and *post*-structuralist J. Baudrillard, based on analogy of dy-

namic and statistical methods of natural science description, on the one hand, and linguistic models, on the other, already anticipates long-awaited scientific recognition of occasionality as «fluctuation» of law and «reversibility» of causality «on the other side of uncertainty principle» [2].

However, relativistic authority of the latest physical and mathematical models of natural science in philosophers with the prefix «post-», as shown by the works of less radical authors [17], may hide conjuncture or oversaturation with diversity of non-classical stage of socio-humanities. Non-classical negation of differential equations structure as more justified for description of mechanical motion continues here in an attempt to explicate the ways of mediating objective cognition by subjective guidelines and meaning-making in general. «If classical image of science focused on construction of a single generalized theory, and non-classical image of science – on complementarity of different ways and languages of description of quantum mechanical phenomena, then post-non-classical science defends the idea of fundamental diversity of descriptions and explanations insisting only on clarity and methodological transparency of original principles and premisses, on consistency and argumentation of scientific discourse carried out in dialogue and critique of other principles and ways of reasoning ‹…› Scientific knowledge appears as a multilevel network of interconnected symbolic conceptualizations, and its nodes as semantic concepts existing in acts of scientific communication, including primarily in acts of verbal communication» [14, p. 473, 481]. The researcher's freedom of action is now determined not only by the potential of the system and its environment but also by its guild values as a managerial level («order parameters») and *personal* – as a kind of fluctuations.

Due to their ambiguous sensitivity even to such seemingly eliminated by ubiquitous scientific norms of cognitive interventions as *subjective guidelines*, the objects of leading science are often called «human-like»: under conditions of mobility, instability and tendency to constant branching («bifurcations») of objective properties, their *ascertaining* merges with the (pre)*construction* of the studied processes through «saddling» any of the detected flows. In this sense, facts about such objects cannot be considered appropriate for removal in the relevant theory: being «alive», they force the researcher to treat *reality as a subject*, not a passive object or means, as in classical tradition. «In classical science, nature acted as an „inverse object", in non-classical – as an „irreversible subject", as extremely fragile totality of organismic quality, where humans also belong ‹…›» [3, p. 344].

From intuition of such «cognitive dialogue», two contradictory methodological tendencies are implemented corresponding to semiotic and culturological *programs* of modern philosophy of science and solving common problems of increasing empirical sensitivity, critical breadth and predictive power of cognitive means in different ways. The *first* one, based on the rationalist value of idealized existence, relies on the variable-*prognostic* function of theories in mastering the instability and ontological activity of post-non-classical objects due to increased capabilities of computing instruments (for cybernetics, information theory, computer simulation, automatics theory).

The *second* one follows phenomenological *value* of fullness of existence: since self-organization phenomena have semantic load expressing previous stages and related connections of their system existence, their representation should include communicative and applied context of the cognition subject. Representation of symbolic connotations of this «tangential» context as an explanans of theoretical explanation can lead to changed *pattern* of scientific theory – from natural to *socio-humanistic*. Then the role of local theoretical elements will be performed not by ontological axioms, but by *meta*subjective (historical, national, professional paradigms) norms and rules regarding word usage, behavior, economic, political, moral or aesthetic decisions. And since explication of these norms and rules flows into practical skills of their implementation (*the tacit knowing*), *understanding* comes to forefront among functions of the new theory. After all, in its original meaning, understanding the meanings of a human work is possible only as a reproduction of the creative act of its author with all *pre*requisites and *inter*relations. Thus, notions, which were perceived mainly as false subjectivity in the Cartesian tradition («will as a source of delusion») – foreign content subject to elimination or an artifact of scientific research – now acquire positive status («will to truth»). Irreflexive life-(cultural-)significant meanings and meaning-forming structures join the image of a less active but dispassionate and intelligent subject of scientific cognition providing for interpretation of scientific knowledge not only from methodological and epistemological positions but also in the context of human experience and interpretation of themselves.

Thus, a new paradigm of *socio-humanistic* research should be implemented, where methods of introspection, empathy, dialogue, projective-games, transpersonal methods and other resources of humanistic *discourse* will be more recognized in addition to classical scientified (with its priority on inductive empiricism, objectivist verificationism, causal explanation) – everything in impulse of expanding intrascientific reflection on subject-object *inter*dependence. In an interdisciplinary perspective, purely *cognitive* relations to which classical model of scientific cognition is reduced are only part of more fundamental integrity of *subject-subject* relations. Such «aufheben» is already observed within the socio-humanistic «landfill», where humanitaristics and social methodology form a hermeneutic cycle of internal and external causes of their objects, when the external serves as a resource and criterion for self-development of the internal. «Science is a single system despite all its variety of components. And general orientation of its divisions as a whole is the same – identification of area of "the possible". Only when natural science determine possibilities hidden in the surrounding world, then the humanities contribute to understanding of the human action capabilities. In particular, those remaining unimplemented so far» [7, p. 33].

In *ontological* terms, post-non-classical picture of the world manifests dynamic parity of stochasticity and structural order (according to I. Prigogine, order and disorder exist as two aspects of one whole) under the auspices of *priorities* of complex over simple, hierarchical over homo- and heterogeneous, emergent over additive and holistic, probabilistic determination over mechanistic or teleological. In *socio-cultural* terms, principled pluralism and ambiguity are affirmed under the auspices of axiological priority over the naturalistic one; in *anthropological* – relation of bifurcation and dialogicity under the auspices of priority of the anthropic over the epistemological; in *methodological* – constructivism in description, explanation and prediction under the auspices of priority of the appropriate over the representative, the situational over the program, the efficient over the formalized.

As for *epistemology*, priority of the prescriptive over the descriptive is established, and collective characteristic of «nonlinearity» is manifested in denial of binary oppositions and homogeneous space of classical thinking: instead of intuitive grasping of the whole from the position of an absolutely transparent subject, in order to consistently derive neutral and denotative propositions about parts fterwards, a discourse of verbal communication of relative subjects is being established – with practical tropes, clishes, toposes and gestalt-shift of thought from one whole to another. «Theoretical status of epistemology moves away from the natural-scientific ideal of theory and approaches its ancient prototype: theories give way to scenarios and approaches, method – to discourse, concept – to metaphor, truth – to consensus» [9, p. 480]. This reveals current trend of increasing the share of interdisciplinary and comprehensive research on the one hand and relativization of a *cognition subject* on the other. The latter is even preferred to be called a «cognitive *agent*» insofar as it adopts the «ecological» properties of its object – incarnation, inactivation, situationality, emergentnity [10]. For instance, incarnation reveals dependence of knowledge content and form on the agent's structure, its functional features and even the spatio-temporal location. For epistemology, this means irreducibility of specific circumstances of sensory perception, figurative aspects of thinking and bodily bonds of the mind.

Conclusions. Indirect access to a non-classical object belonging to other ontological level has not only accustomed scientific community in the epistemological aspect to objects disproportionate to everyday practice and images («electronic shells» of chemistry, «unconscious» of psychology, «genes» of biology…) but also led in methodological terms to impossibility of removing *subject*-operational factor from research context (statement of question, observation conditions, solutions generation, results verification). Hence, revolutionary consequences were ontologization of object relations as one of the interacting parts of environment (*«relationalism»*) and denial of absolute – independent of spatio-temporal conditions – frames of reference, subject characteristics and means of influencing the object, as well as linguistic and logical-methodological norms of philosophy of science (*«relativism»*).

Initially, the gap in absolute limit of the known gave rise to a neo-positivist program of restructuring this limit (*«demarcation criterion»*), which involved restoring the lost homogeneity of the theoretical and the empirical through dissolution of absolute truth in invariants of the construction of the relative. Further diffusion of a natural object and de-universalization of the subject have violated classical principle of aprioral correspondence of their categories in the process of cognition and led to the belief that logical structure and content of knowledge cannot claim to be absolute and extra-historical. As a result, classical *line* of the method as a description and analysis of scientific research stages has developed into a *plane* of methodology of *areas* of scientific activity methods applicability of various kinds and scales, and procedural skills – into *methodological culture*. The latter involves the ability to implement cognitive tools in accordance with the subject, on the one hand, and internal or external tasks, on the other. In this way, post-non-classical science recognizes revolutionary situations in scientific knowledge dynamics and removes boundaries of the known from epistemological to institutional (sociological and communicative) foundations of science. Representation of symbolic connotations of these foundations as an explanans of theoretical explanation can lead to changed pattern of scientific theory (from natural to socio-humanistic) and requires further study.

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