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Causality, Effectiveness, Determinism

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The author describes his conception of the relationship of such philosophical concepts as causality, effectiveness and determinism. The notions of material causality and teleonomic causality are compared. The study shows the difference between the doctrines of monocausalism and conditionalism. Causality is interpreted as a special case of effectiveness, and effectiveness is defined as the essential attitude of changes on an output of nonequilibrium system to changes on its input. The principle of determinism is specified and expanded. The author's analysis proves that the principle of determinism must not be reduced to the idea of causality.

Keywords: the idea of causality, cause and effect, teleonomic cause, indeterminism, monocausalism, conditionalism, reverse connection in unbalanced system, effectiveness, the principle of determinism, the non-deterministic tendency.

1. The idea of causality

Cause and effect – the pair philosophical categories which together express one of the moments of general interaction, genetic communication of phenomena, i.e. this pair indicates the specific influence of some base on its substantiation (Pivovarov, 2003, 108).

The idea of causality, possibly, has occurred from supervision over actions of people on creation and change of things, and then it has been extrapolated on all space (the world order) and has got universal sense. The formula "*if p, then q*" usually expresses the principle of causality. The following definition is in the basis of this formula: the cause is such a phenomenon *p* which generates with necessity other phenomenon *q*, i.e. its consequence. Necessity shows itself through accidents, that's why always there is a moment of randomness in realization of any cause (Suppes, 1970). Cause and action (effect) are not things. They are necessary events that take place in things.

By virtue of unity of the world, each phenomenon depends to some extent on some other phenomena. Forms of interconditionality of phenomena are diverse; among them in contrast with causality modern determinism allocates such not genetic dependences, as functional, probabilistic, correlation connection and links of conditions. The mental operation of formal logical sequence (implication) is different from the objectively-real causal link. Although the implication is also expressed by the formula "*if p, then q*", but it is not necessarily linked with the idea of material derivation of one another (the generation of the consequence *q* by its premise *p*).

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In opinion of the majority of philosophers and scientists, process of causing is directed in one way only. It is characterized by a time asymmetry (proceeds from the existing to the arising). The process of causing is irreversible. The consequence cannot exchange a place with its cause. Critics of this point of view consider illogical the statement as if the cause precedes in time to its consequence – after all, then, is that in the interval before the appearance of the consequence *q* the cause *p* at all is not a cause as does not generate *q*. To assume, first, more correctly that *p* and *q* coexist simultaneously, and secondly, that consequence provides jet impact (reverse) on the reason.

There is also questioned the universality of the principle of causality. Some researchers speak about an opportunity of causeless material things. The declaration appears periodically, that the principle of causality has become outdated and has lost its methodological value for sciences. So too there is an opinion, that mankind, which anthropomorphized phenomena of nature, attributes causality to them, while causality is not inherent in the very nature of things. However, the majority of scientists do not hurry to part with the principle of material causality.

Often causes of phenomena deeply hidden from the eye and it are necessary to search them thoroughly. They should be reveal and calculate carefully, being based on intuition, observation, experiment, logical thinking. You can study the process of causing in the aspects of matter, energy and information. Idealists believe that the objective or subjective aim (information) is capable in itself to generate phenomena whereas modern materialists see a cause as a unity of substance, energy and information, every time correlating them among themselves in different proportions. According to a degree of the importance of this or that abstractly allocated aspect of causation, the cause is spoken of as about primary transition from *p* to *q* either substances, or energy, or information. In this case, scientists rely on the laws of conservation of matter and energy, as well as on the law of increase of information.

The causes are classified in different ways. The final cause (in Latin – *causa finalis*) is derived from the Absolute as the primary source (the God, matter-substance), and secondary causes – from modes of the Absolute. Immediate causes have direct effect; indirect causes will be completed through a number of intermediate links. It is possible to distinguish the internal and external, major and minor, rigid and non-rigid causes. They are one-linear, two way feedback and branching circuits of causing. The objective causes are carried out irrespective of will and consciousness of people. The subjective causes are concluded in goal setting, will and actions of people; these causes depend on emotions, experience, reason and intuition of human beings.

Teleological causality – a special case of informational causality. Teleology (from Greek – *telos*; genitive *teleos* – an aim; *logos* – a word, doctrine) explains the whole chain of world events and the genesis of individual phenomena by reference to the belief that there is a concerted impact (of the God, entelecheia) on the substance; the creative consciousness of the person, too, is treated as the source of causal determination. Teleology is usually understood as: 1) the doctrine about implementation of some superhuman objectively-ideal purposes (transcendent or immanent) in nature and society; 2) the concept of causal dependence of artificial objects on the conscious aims of people. This doctrine developed mainly within the limits of idealistic philosophy.

As it is known, W. Wundt introduced the concept of psychic causation and argued that some of the mental processes depend strongly on other psychic phenomena: feeling depends on perceptions, perceptions are due to our will, etc. (Wundt, 2007). It should be noted that some

modern materialists have unwillingly recognized (although with funny pantheistic reservations) teleological causality. They have tied the idea of objective spontaneous law of the world with the idea of expediency of organic and technical integrity and have altered "teleological cause" in "teleonomic cause" (from Greek: *telos* – aim, *nomos* – law, science). In their opinion, the expediency is not incorporated initially in wildlife, and it is a result of spontaneous evolution of matter.

For example, there is a proposal to replace the notion of teleology, which has a specific meaning in theology and idealism, with scientific and materialistic concept of teleonomy (Alekseev, Panin, 2004, 497-498). Teleonomic causality is defined as the spontaneous regular generation of phenomena of nature by informational streams (program) with the organized feedback. Aims that men are guided in their impacts on signs or objects of practice refer to the category of consciously-teleonomic cause.

But is recognition by some materialists of teleonomic causes differs essentially from the thesis about realization of laws of matter in physical phenomena? Apparently, it is a tautology. In this case, it turns out that matter-substance somehow always strives to objectify its permanent aims-laws in the form of phenomena of nature, but never sells them to the end, does not reach phenomenal perfection. If laws of nature are eternal and everything is subordinated to them, then the teleonomic causes are universal. Therefore, all other causes should be derived from aims-laws, and this is equivalent to the assertion that none of substantial aim can be fully implemented until the end.

If teleonomic causes (read: "objective aims-laws") are eternal and do not evolve, then it is illogical to claim that expediency in living nature is, on the one hand, a special case of constant teleonomy, and on the other – a consequence of the spontaneous process of changing teleonomic causes. The opposite thesis would be more logical:

(a) either teleonomic causes evolve;

(b) or expediency is contrary to teleonomy and occurs in spite of it.

Finally, it is not clear, why do we need to convert the external analogy between purposefulness and spontaneous action of some natural law into pantheistic thesis about the spontaneous purposes of matter? Much easier to assign the supermind to matter-substance and then say after monotheists that the Absolute turned its conscious aims in the physical laws and subordinated all natural phenomena to these laws.

It is considered, that Buddha Gautama the first has formulated the principle of causality in the general form and has given ethical sense to it. He taught that life is suffering, and sufferings are caused by our desires. The main causes of suffering are envy, ignorance and lust. Aristotle, F. Bacon, B. Spinoza and J. S. Mill have brought the greatest contributions to the development of the principle of causality.

Aristotle introduced the notion of the first cause of universe. The first cause is the Nous, divine mind, primordial engine. It is primary, unique, simple, and transcendent; it defines itself. Considering an example with a sculptor, Stagirit classified the causes on acting, material, formal and teleological. The acting cause – the sculptor himself, he makes changes. The material reason – substance (marble) in which there are changes. The formal reason is a principle of organization of matter. It is an idea that is inseparable from matter, i.e. the form of a product of sculptor's activity (the finished statue). The teleological, or final, cause is connected with representations about those or other attractions, intentions, aims of any action – for example, with the desire of the sculptor to make a fine artistic object (Aristotle,

1999, 106-109). Modern philosophers prefer to use only concepts of the acting and teleological causes.

D. Hume expressed doubt in the universal status of the principle of causality. On what basis it can be argued that any arising thing has its cause and why the reason must necessarily produce specific consequences? Reflecting upon these questions, Hume came to the conclusion that it is impossible to prove logically the existence of causality because something that is taken for "effect" is not contained in what is called "cause", and the majority of the consequences are not similar to their causes. The concept of causality was born, in Hume's opinion, from the following ordinary conclusion: "After this, therefore because of this" (in Latin: "Post hoc, ergo propter hoc"). Such erroneous conclusion grew over time into a stable association of expectations and became a mass habit. People began to believe that if *p* appears somewhere, it will by all means generate event *q* in future. In fact, physical necessity is a fiction of human brains. Contiguity and connection of *p* and *q* are sensually perceived, but the necessity of their relationship is not given to us in our experience. Hume concludes that the principle of causality derives from the characteristics of our psyche, and this principle is hardly applicable to the real world (Hume, 1966). The philosophical doubt in objective character of causal relationships or denying of universality of the principle of causality can be named "indeterministic tendency in philosophy".

J. S. Mill, developing empiricism of F. Bacon, invented such inductive methods of revealing of different reasons as methods of similarities, distinctions, related changes and remains. The general idea of these methods consists in the consideration of the circumstances of the studied phenomenon with a view to the exclusion of all those of them, which cannot be the cause for it (or consequence), and to recognize not excluded circumstances as the desired cause (Biryukov, Shvirev, Sukhanov, 1964, 421-423). The way of action of causes and specific features of consequences change with the variation of conditions.

It is often believed, that identical causes generate identical consequences. A cause, however, is realized not in a "pure" form, but through variety of causal conditions. The causal conditions are the factors, which influence on the occurrence, existence and disappearance of one thing or another, but which in themselves do not produce this thing (Parniuk, 1972). A pretext can play a certain role in the initiation of a causal link – that is the external trigger condition of a random nature.

It is difficult to separate causes from conditions of their actions not only in practice but also in theory. Therefore, two methodological approaches are competing constantly – monocausalism (from Greek: *monos* – one, the only one; from Latin: *causa* – cause) and conditionalism (from Latin: *condicio* – condition). Really, the border between conditions and causes is relative – a cause operates through conditions and under their influence.

Monocausalism accepts the thesis that each phenomenon has the only one own cause, and causality is entirely different from the amounts of conditions. In essence, monocausalism denies the important role of conditions in the production of consequences through causes. Many traditionally minded philosophers and scientists prefer to position of monocausalism. In contrast, conditionalists (J. S. Mill, M. Fervorn, etc.) reduce each cause to the full amount of all conditions that precede the explained phenomenon. They dissolve a cause in the related conditions, or even offer to eliminate the concept of cause from sciences. Attempts to find the «golden midst» between these points of view yet do not have a logical clarity.

2. Efficiency

Efficiency – the essential attitude of changes on an output of nonequilibrium system to changes on its input. Transformation of one form of energy into another lies in the basis of many of nonequilibrium processes. Usually we start using the concept of efficiency, when we ask the questions: (a) what is the loss of energy? (b) whether it is possible to reduce losses to some reference level?

Efficiency of functioning of nonequilibrium system is defined by its ability to resolve internal and external contradictions. There are some conditions and the requirements which relate to the parameter of efficiency:

(a) the parameter of efficiency characterizes system as a whole, instead of its any part;

(b) the parameter of efficiency and its dependence on the established factors should provide reception of a quantitative estimation with demanded reliability;

(c) it is necessary, that the area of changes of the parameter of efficiency has precisely outlined borders.

The parameter of efficiency is some amount received from division of an output stream of a system on its entrance stream (Bistry, Pivovarov, 1989). Feedbacks have a significant impact on the efficiency of the functioning of any system. In this case the feedback is understood as the impact of the results (output) of the functioning of nonequilibrium system on the character of the functioning (input) itself. Under certain conditions the feedback (positive or negative) can provide growth of efficiency of use of external energy.

In the most general sense the concept of effect means realization of energy of some cause in its consequence. A small cause sometimes produces an avalanche-like, a catastrophic effect, i.e. it acts as a starting causality. You should not limit yourself only to the discovery of the prime cause in the analysis of the functioning of the nonlinear system. Also it is inadmissible to ignore the internal and external random factors, the role of boundary conditions and environment, because that's exactly fluctuations determine to a decisive extent a radical transformation of the system in the field of attractors.

The traditional notion of cause becomes very vague with respect to self-organizing systems with feedback, which are widely distributed in nature. I. Kant and G. W.F.Hegel had been agreed with the idea of non-linearity and the irreversible nature of the interaction of the material cause and effect: there is something in the action (in the consequence), which was not in the cause. Even if the cause has stopped, the effect, initiated by it, continues to develop. The substrate that is experiencing the impact of any cause has an active infertility. This is especially the case for the living organisms and the spiritual human life – do not allow the continuation of any cause in them, but to interrupt and transform this cause. In Hegel's opinion, abstract rational interpretation of communication of a cause and effect – as time precedence and necessary generation of consequence by its cause – can be overcome as a result of more multilateral understanding of causality as interactions and mutual changes of a cause and effect: interaction is the causal relationship, which is placed in its full development (Hegel, 1975, 331-340).

In order not to confuse rational and more scientific understandings of causality, possibly, it is necessary to generalize them in a special notion of efficiency in which concepts of cause and effect are reflected most full. Efficiency is such a process (and result) of interactions of straight ties and feedback in nonequilibrium system which conducts self-organizing system to realization of some aim.

The concept of efficiency is not identical to the representation of fatal necessary creation

of an effect *B* by a starting factor *A*. The real process of generating of *B* is anyhow connected with the action of factors and conditions – necessary and incidental, external and internal. Internal accidents play the major role in the functioning of the nonequilibrium system. The nature of such accidents is hidden in the relative autonomy of elements of a system. Complicated internal processes occurring in any of subsystems, are capable to change (especially in the points of bifurcation) purposeful behavior of its system. The activity of elements of the given system creates the internal and rather independent flows interacting with the main stream of this system. Therefore the notion of efficiency includes the integrated result of necessary and accidental causality, and both have internal character. External noise, changes in the environment and conditions of functioning have a significant impact on the behavior of a system.

The concept of efficiency is an original measure of dynamics of two opposite processes inside of a system – entropic and negentropic. The parity of these processes varies at different moments of time. Or one or another trend dominates. Thermodynamics of irreversible processes allows uniting three fundamental theoretical grounds: (a) the second beginning of thermodynamics for open systems; (b) the principle of growth of negentropy, which develops mainly by biological science; (c) the notion of efficiency of transformation of energy.

The concepts of cause and effect explain very little in relation to systems with feedback, because sometimes external and internal flows turn mutually into such a way, that a consequence in such systems appears much more actively then its cause. However, there are systems, in which feedbacks cannot physically influence a source of the input signal and its energy. Nevertheless, and in this case the feedback still actively changes the content which is delivered to the input of the system. Sometimes the source of the external flow, passing through the system, disappears. However, the transformed content of this stream is reproduced inside the feedback on the input of the system.

Any flow in a system is caused by the difference of potentials whatever they may be (the difference of potentials creates a generalized force). Surplus and shortage of a potential are extreme sides of the stream to the output, hence the parameter of order takes both positive and negative values. Sometimes a system can use its internal nonbasic streams in order to return rapidly to the equilibrium (steady) state. Or, on the contrary, it happens that these nonbasic flows can increase the free energy of the system, which is spent on counteraction to external flow.

Efficiency of functioning of nonequilibrium system is connected with manufacture of entropy, and it means, that growth of dissipation of energy will increase efficiency of the system. Thus, efficiency is the integrated parameter of nonequilibrium system which characterizes the interaction of such system with its environment and the ratio of processes of reversibility and irreversibility in it. Efficiency is correlated with nonequilibriumness. It is defined through the parameters of nonequilibriumness. And it is a function of integrity of a system and the parameter of order.

As a matter of fact, external and internal streams form productive force of nonequilibrium system because they do the work, as a result of which the system tends to an extreme condition. It is impossible to describe exhaustively the evolution of any natural or social system with the help of the traditional doctrine of causality, as it should to consider the unimaginable quantity of interactions within each element. It is necessary to take into account a coordination of spatial and temporal characteristics of nonequilibrium

conditions, as any part of each whole has its own rhythm and its own orientation.

If to recognize the epistemic complexity of nonequilibrium systems, you should make a conclusion, that the concept of efficiency is more constructive than the concept of monocauslism. The concept of efficiency is able to unite two statements in some dialectical synthesis: (a) every effect has only one reason (monocausalism); (b) every phenomenon is a product of a large number of conditions (conditionalism). As we can see, the concept of efficiency considerably expands the idea of causality.

3. Determinism

Determinism (from Latin *determino* – I define) – the philosophical doctrine about various kinds of conditionality of the phenomena of material and spiritual world. In ancient immemorial times there appeared the ideas that things are created by the primary elements, and some phenomena depend on other phenomena. These ideas are rooted in ancient myths about the creation of the world, are covered in religious doctrines about deities, predestination and fate, found in animism, totemism, fetishism and magic. The word "*determination*" comes from the word "*Terminus*" – the name of the Roman deity of borders and field edges. Later this word has come to mean the operation of logical definition of a concept through the nearest sort (genus) and species differences. Now it began to be applied more broadly and is understood as the objective dependence of things on the causes that give rise to them – on first principles, laws of nature.

The central and traditional principle of this doctrine – the principle of causality. In the recent past only the doctrine of the universal causality was brought under the concept of determinism. The world depicted in such determinism in the form of a chain of causes, which act directly and rigidly. There was no place for accidents in this circuit. Nowadays the content of determinism has significantly extended. Determinism has replenished with the ideas of the indirect reasons, random or probabilistic forms of causality. Also determinism included now the idea of noncausal links, indirectly associated with causality (Anscombe, 1971).

Quite often philosophers offer to formulate the general definition of determinism through the notion of objective law: "determinism is the doctrine about the objective lawful relationship and interdependence of phenomena of material and spiritual worlds". This widespread definition, undoubtedly, is narrow. Firstly, it is not taken into consideration the objective nonlawful determination of phenomenal type (accidental singularity, a single mutation). Secondly, this definition does not provide subjective forms of determination (teleological, unconsciously, mental, logical-functional). Those who accept such definition, consider the supporters of any teleology (objective-idealistic and subjective-idealistic) as "indeterminists".

Many (but not all) materialists long time rejected the idea of teleological determination and purposefulness of the world. Whether however it is possible to deny the fact of the expedient device of plants, animal, technical constructions? Materialists are not able to clearly prove that the "subjective reasons" are just the empty fabrications of idealists, and that the causes of any human mental constructions (including poetic images, fantasies and even logical errors) must be bound to withdraw from the regularities of neurophysiological processes, schemes of practice or of the objective laws of the external world.

Among Marxists, for example, the opinion prevails that indeterminists, in particular, are the thinkers who see the source of the causal relationship in the human consciousness. This view is inaccurate. It is difficult not to recognize

the specific dependence of human actions and affairs on the conscious aims of the people. The creative power of consciousness and subjective goals – the most important factors of human activities, which theology studies. If science does not take into account the role of goal-setting in the trajectory of motion of bodies, it is often not able to explain these trajectories. So, from a purely physical description of the observed trajectory of flight of the plane a scientist cannot determine the avenues of further displacement and the landing point of the physical bodies – for this you need to know the goal of the flight pursued by the pilot. Therefore, in my opinion, teleology should be considered an important form of determinism.

Strictly consistent indeterminism is very rare in the history of philosophy because the profession of a philosopher requires rational and demonstrative explanations the ultimate foundations of being and thinking. It offers to withdraw logically something dependent from independent – from those or other basic intuitions about matter, spirit, consciousness, will, etc. Materialists are convinced that true determinism is the concept of material determination only, and idealists, on the contrary, search for the truth in determining matter by spirit.

In my opinion, indeterminism is not a special and separate philosophical current. It is the only one of the trends in any philosophy – the tendency to put under doubt or deny determination (material or spiritual). This trend should be, although in different ways, is associated with the opposite desire to think of the dependence of the material and spiritual phenomena of some factors. This tendency is necessary, though differently, interfaced to opposite aspiration to reflect upon dependence of material and spiritual phenomena on any factors. For example, it is probably incorrect to rank unconditionally Hume or Kant to indeterminists that Marxists do pretty often. Hume justifies the belief in causality through reference to sustainable habits of people, and Kant – to the unconditional and the innate ability of the human productive imagination. At the same time, from the point of view of idealists, materialistic denial of teleology is also a peculiar nondeterministic tendency. Apparently, one can say that Marxism is determinism «from the bottom» and indeterminism – «from the top».

A more precise definition of determinism requires different and more abstract concepts than "causality" and "objective law". Probably, the concepts of basis, foundation and superstructure would be more appropriate here. Determinism is the doctrine about determination, i.e. about forms of dependence of foundation from its basis and superstructure – from its foundation. The character of determination is identified in connection with the specificity of respective conditions. So, the consequence is due to its cause and causal conditions. A function is determined by the conditions of introduction of some independent variable. Natural phenomena are determined by the peculiarities of action of objective laws.

There were three concepts of determinism in history of philosophy: objectively-idealistic (Plato, Aristotle, Plotinus, Hegel, etc.), subjective-idealistic (Protagoras, Berkeley, Fichte, Kant, etc.) and materialistic (Democritus, Hobbes, Holbach, Feuerbach, Engels, etc.). Objective idealists believe that space and our consciousness are created and defined by the goal setting activity of the spiritual Absolute, transcendent or immanent. Subjective idealists are looking for the cause of our world view in the activities of human consciousness, which produces ideal goals, invents images of the world's communications and extrapolates them outside. Materialists deduce the ultimate cause of the world order from the idea of universal and lawful interaction of material phenomena.

We can distinguish three periods in European history of materialistic determinism: (a) antique

determinism (the school in the city of Miletus, atomists, the teaching of Anaxagoras, etc.); (b) mechanical determinism of the XVII- XVIII centuries (Galileo, Newton, Hobbes, Laplace, etc.); (c) determinism of a probabilistic type in the XX century. Some scientists predict that probabilistic multi-valued determinism appears in the XXI century, which is hard to imagine.

On P.A. Holbach, all material and spiritual events are fatally predestinated (Holbach, 1963, 237). P.S. Laplace thought about the universe as a closed system and believed that it is possible to predict unequivocally the state of the world at any moment, if we know the initial conditions (Laplace, 1982, 364). This view is called "Laplace's demon".

Unlike Laplace's (hard, «iron») determinism, probabilistic determinism teaches that the given cause does not necessarily directly produces the relevant effect. A cause often acts in a non-linear manner through a variety of internal and external conditions. It depends on the history of the former interactions, and its desired character appears in the form of accident. Special periods have not been allocated in the history of idealistic determinism, although, for example, Plato's metaphysical determinism explicitly differs from dialectical determinism of Hegel. The concept of predetermination plays an important role in objectively idealistic determinism.

Modern philosophical discussions focus on three levels of causal determination: are there (a) any singular causation; (b) causal laws, (c) and causal powers (causal potentiality and possibility)? It is also important to find out, what is the relationship between these levels? (Mellor, 1971). For example, for every singular causal fact is there a law that it can be brought under (Davidson, 1980)?

In sociology number of concepts relate to some form of determinism. Thus, the teaching of K. Marx called "economic determinism", since it states that all forms of social being and social consciousness are determined by the objective economic laws, which prevail in the society. Representatives of "cultural determinism" developed the idea that every culture causally determined by the basic ideals and norms of life. E. Durkheim and M. Weber have shown that it is religion which sacralizes these core values. "Technological determinism" – a kind of social determinism, according to which social development is determined by the technical civilization, but the growth of technology depends very little on the consciousness and activity of the people creating it.

References

1. Alekseev, P., Panin A. (2004) Philosophy [*Philosophia*]. Moscow, 2004, P. 497-498.
2. Anscombe, G.E.M. (1971) Causality and Determination, Cambridge, 1971.
3. Aristotle (1999) Metaphysics [*Metafizika*]. Rostov-on-Don, 1999. P. 106-109.
4. Davidson, D. (1980) Essays on Actions and Events, Oxford, 1980.
5. Biryukov, B., Shvirev, V., Sukhanov, A. (1964) Methods of investigation of the causal ties [*Metodi issledovania prichinnih sviazei*]. Encyclopedia of Philosophy. In 4 vol. Vol 3. Moscow, 1964, P. 421-423.
6. Bistry, G.P., Pivovarov, D.V. (1989) Non-equilibrium systems: integrity, efficiency, and reliability [*Neravnovesnie sistemi: tcelostnost, effektivnost, nadezhnost*]. Sverdlovsk, 1989. P. 82-119.
7. Hegel, G.W.F. (1975) The science of logic [*Nauka logiki*]. In 3 v. V. 1. Moscow, 1975. P. 331-340.
8. Holbach, P.A. (1963) The system of nature [*Sistema prirodi*]. Selected works. In 2 vol. Vol. 1. Moscow, 1963. P. 237.

9. Hume, D. (1966) A treatise on human nature [*Traktat o chelovecheskoi prirode*]. Works in 2 v. V. 1. Moscow, 1966, P. 168-181.

10. Laplace, P.S. (1982) The presentation of the system of the world [*Izlozhenie sistemi mira*]. Leningrad, 1982. P. 364.

11. Mellor, D.H. (1971) The Matter of Chance. Cambridge, 1971, Ch. 4, 8.

12. Parniuk, M.A. The principle of determinism in the system of the materialistic dialectics [*Prinsip determinizma v sisteme materialisticheskoi dialektiki*]. Kiev, 1972.

13. Pivovarov, D.V. (2003) The main categories of ontology [*Osnovnie kategorii ontologii*]. Ekaterinburg 2003, P.108.

14. Suppes, P. (1970) A Probabilistic Theory of Causality, Amsterdam, 1970.

15. Wundt, W. (2007) Introduction to psychology [*Vvedenie v psihologiu*]. Moscow, 2007.

Причинность, эффективность, детерминизм

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В статье изложена авторская концепция взаимосвязи таких философских понятий, как каузальность, эффективность и детерминизм. Проанализированы концепты материальной каузальности и телеономной причинности. Показано различие между учениями монокаузализма и кондиционализма. Причинность истолкована как частный случай эффективности, а эффективность определена как существенное отношение изменений на выходе неравновесной системы к изменениям на ее входе. Уточнен и расширен принцип детерминизма, доказана его несводимость к принципу причинности.

Ключевые слова: идея причинности, причина и следствие, целевая причина, индетерминизм, монокаузализм, кондиционализм, обратная связь в неравновесной системе, эффективность, принцип детерминизма, тенденция индетерминизма.