

## **On the laws of the objective world and the laws of science**

V. P. TUGARINOV (*Leningrad*)

*From the journal "Problems of Philosophy", No. 4, 1952, pp. 78-92*

Our country is experiencing a period of transition from socialism to communism. This presents Soviet science with a vital task: to strengthen the ideological foundations of our people, intensify the struggle against the vestiges of bourgeois ideology, firmly ground all areas of science in the principles of dialectical materialism, and infuse all scientific research with Bolshevik partisanship.

The development of nature and society is based on the operation of objective laws, independent of consciousness. People cannot create or abolish objective laws at will, but they can understand their effects and master them. Understanding this is of enormous theoretical and practical importance. Understanding the essence, nature, and conditions of their operation is a powerful tool for the scientific use of laws to change the world.

The Marxist-Leninist doctrine of the laws of development of the objective world in a socialist society, where laws are put at the service of the workers, where the knowledge of the laws of development of nature and society and their scientific use by the broadest masses of the people constitute one of the main conditions for successful progress towards communism, is acquiring particular relevance.

The concept of law is an important category in materialist dialectics and the specialized sciences. The task of science is not simply to accumulate facts, but to establish the lawful connections that exist between objects and phenomena in their development. In his works on linguistics, I. V. Stalin points out that the vocabulary of a language, taken in itself, is merely the building block for language, but does not constitute language itself. Only through the rules and laws of grammar can language be created from this material. Individual facts and phenomena studied by science serve precisely as the building block from which, with the aid of laws, the palace of science is erected. Only by uncovering the lawful connections between natural and social phenomena does one understand the essence of these phenomena and the process of their development, enabling science to systematically and effectively serve the productive and revolutionary social practices of humanity. The more deeply science uncovers and masters the laws of the objective world, the truer, more fruitful, and more powerful it becomes.

\* \* \*

In contrast to idealism, materialism recognizes the existence in nature of objective laws independent of consciousness and the possibility of their cognition by man.

The old, pre-Marxist materialism was unable to rise to a scientific understanding of society and the laws of its development, was unable to

understand the historical **process** of human cognition of the laws of the objective world, and was unable to reveal the dialectical unity and difference between the general and particular laws of nature.

For the first time in the history of human thought, Marxism provided a unique scientific solution to the problem of law. Unlike metaphysical materialism, Marxist philosophy views the development of society as a natural-historical process, occurring on the basis of objective laws independent of consciousness. Marxism discovered and formulated the most general laws of nature, society, and human thought, established the relationship between general and specific laws of development in the objective world, and revealed the dialectical nature of their action and manifestation. Marxism believes that cognition of the objective world and its laws represents a dialectical process of approaching an increasingly accurate and complete reflection of them.

Idealism denies the existence of objective laws that exist independently of consciousness and considers the laws of nature and society as the products of ideas, spirit, and consciousness.

Objective idealism interprets laws as manifestations of the absolute idea, the spirit in general, and subjective idealism - as the result of the activity of individual consciousness.

Marxist philosophy teaches that law expresses the objective connections, interdependence, and interdependence of phenomena that exist in nature and society. The organic interconnectedness of phenomena occurs not chaotically, but in strict sequence.

Any law always expresses a connection, a relationship between phenomena. A law expresses not the difference between phenomena, that is, not what separates them, but what connects them, what they have in common. Objects and phenomena of nature and society are interconnected, possessing something common to them all or a particular group of them. This is the real, objective basis of a law. Thus, a law, acting as a relationship between phenomena, expresses the unity of phenomena, "identical in phenomenon"<sup>[1]</sup>.

For example, the law of universal gravitation establishes that every two particles of matter in the universe are attracted to each other with a force proportional to the product of their masses and inversely proportional to the square of the distance between them. This law reveals two interdependencies: 1) between the force of attraction between particles of matter and their masses, and 2) between the force of attraction between particles of matter and the distance separating them. The law expresses the commonality of these relationships in every phenomenon of attraction between any two particles of matter.

It would be a mistake to think that a law expresses only a "pure" relationship between things or their properties, and not the properties of things or phenomena. The properties of a thing are manifested in its relationships and

interconnections with other things. Contrasting the interconnections of phenomena with their properties is characteristic of subjective idealism and is one of its manifestations. Modern neopositivists (B. Russell, A. Eddington, and others) "prove" that there are no things, only relationships. Clearly, if there are no things, then the relationships between them can only be conceptual, not real, not objective relationships, as modern idealists tend to conclude.

Law expresses not just any relationships, but **essential** ones. Lenin wrote: "...*Law and essence* are concepts of the same order, or rather, of the same degree, expressing the deepening of human understanding of phenomena, the world, etc." [2].

Law cannot encompass all aspects and aspects of a living phenomenon. The latter represents an infinite diversity, revealed in the process of development. Law, as an objective interconnection and interdependence of phenomena, encompasses only certain essential aspects of a phenomenon, or even just one, but essential, aspect. Consequently, "phenomenon *is richer than law*," for phenomenon is "wholeness, totality," "law = part."

Thus, the law of gravitation deals with only one property of bodies: to attract and be attracted; other properties are not reflected in this law.

If every law expresses an essential relationship, then some laws, namely **the fundamental** laws, express not simply an essential relationship—that is, not just any particular aspect or any particular processes of a phenomenon's development—but all the main aspects and all the main processes of the phenomenon's development as a whole—consequently, they express the essence of the given phenomenon. Examples of such laws are the fundamental economic laws of socialism and capitalism.

A further characteristic feature of a law is **its universality**. This means that the law operates in all cases where the corresponding objective conditions are present. "We know," wrote Engels, "that chlorine and hydrogen, under the influence of light, combine under certain conditions of temperature and pressure to form hydrogen chloride gas, producing an explosion; and since we know this, we also know that this occurs *always and everywhere* where the above-mentioned conditions are present, and it is completely immaterial whether this occurs once or is repeated millions of times and on how many celestial bodies. The form of universality in nature is a law..." [3].

Law cannot be limited to any particular form of connection between phenomena, for example, to functional dependence, as many modern bourgeois theorists do, or even to causal dependence. Everything has its cause. But causal connection is only one of many different connections between phenomena: general-specific; form-content; essence-phenomenon, etc. Law can express each of these connections.

The laws of the objective world express not the random connections of phenomena, but their necessary connections. Criticizing metaphysicians who

view nature as a random accumulation of objects and phenomena, isolated, distinct, and independent of one another, Comrade Stalin notes that Marxist dialectics views nature as "a coherent, unified whole, where objects and phenomena are organically connected, dependent, and mutually determinative"[4]. Law, therefore, appears not only as a form of universality and an essential relationship, but also as a **necessary** relationship.

Necessity, which connects all phenomena in the world, represents one of the most comprehensive, broadest relationships in reality. Necessity is the basis of law, and law is one of the forms in which objective necessity, determinism, manifests itself. However, necessity is also an integral feature of law, just as, for example, materiality, spatiality, and temporal variability, while being properties of all things, are also properties of each individual thing.

This position applies not only to the laws of nature, but also to the laws of society. "...The socialist system," wrote Comrade Stalin in his work "Anarchism or Socialism?", "will follow capitalism with the same inevitability as day follows night"[5].

People, having learned about laws, either use them directly or create conditions that limit their scope of application. In either case, the necessity of law remains.

Attacks on the principle of necessity, determinism, attempts to "liberate" the concept of law from this feature that is unpleasant for reactionary classes, or to "reform" the concept of necessity so that nothing remains of it, are one of the characteristic manifestations of the class ideological struggle of the bourgeoisie around the concept of law.

Modern idealists and agnostics have done much to discredit the concept of law as objective necessity. Reactionary biologists, the Mendelians and Morganists, base the laws of heredity solely on chance. For example, according to their antiscientific views, the occurrence of mutations is random. Development, according to Weismannian biologists, is a realm of chaotic chance, impossible not only to control but also to understand.

Kantians and neo-Kantians consider the law as a manifestation of the properties of our reason, our cognitive apparatus; in their understanding, the necessity of the law is only a logical or psychological category.

Neopositivists also rebel against the understanding of law as objective necessity. Some proclaim that law is nothing more than a functional relationship, meaning that it merely establishes the interdependence of the elements of a phenomenon but does not establish the necessity of this interdependence. Others reduce law to a mathematical equation in order to exclude from the list of laws all laws that lack mathematical expression, primarily laws of social development, and to present laws merely as mental, logical constructs. Still others view law as the expression of a simple sequence of phenomena, thereby again excluding the attribute of necessity from law. Still others reduce the necessity of law to probability, i.e., to

possibility. Distorting the conclusions of modern science, they claim that the latter allegedly does not prove strict determinism, but rather confirms the agnostic idea that in the world there exist only varying degrees of probability: from almost complete improbability to near-necessity. Still others directly reduce law to the rules of logical inference, etc.

Pragmatists (James, Dewey, and others), who believe that truth has no objective meaning, that whatever benefits the bourgeoisie is true, understand laws to be arbitrary combinations of facts. Naturally, this bourgeois, commercial, and transactional approach to law excludes from it the element of necessity, independent of anyone's interests.

Representatives of the neo-Scholastic movement (Gilson, Maritain, Whittaker, Brennan, and others), reviving the medieval subordination of philosophy to religious obscurantism, declare that the basis of the laws of nature is not causality, not necessity, but mystical purposefulness.

All these anti-scientific arguments by the learned servants of capitalism are disguised under the banner of modern science, whose conclusions they distort to suit the class interests of their masters. Taking advantage of the fact that the phenomena and patterns of the microworld, discovered by modern natural science, possess unique characteristics and do not fit into conventional concepts that reflect the patterns of the macroworld, agnostic idealists assert that indeterminism reigns in the microworld, as if the principle of determinism has collapsed. In reality, the study of processes in the microworld has clearly demonstrated that these processes, while distinguished by their own peculiarities and uniqueness compared to phenomena in the ordinary, macroscopic world, are at the same time strictly conditioned, determined, and subject to the action of special laws formulated by modern physics of the microworld—quantum mechanics.

The achievements of modern physics of the microworld supplement our knowledge of the laws of nature with the knowledge of new patterns, confirm the positions of dialectical materialism on the universal determinacy of all phenomena in the world and on the qualitative uniqueness of the patterns of different forms of movement.

Every phenomenon occurs in time and has a certain duration of existence. The law that expresses the essence of phenomena, i.e., something more **stable** than the phenomenon, appears as “durable (remaining) in the phenomenon”[6].

A law is a "calm reflection of phenomena" [7] in comparison with the "restless," infinite diversity of phenomena subject to the action of a given law. A law expresses **the constancy** of the relationship between phenomena or aspects of a phenomenon. Phenomena encompassed, for example, by the laws of physics include various quantities, volumes, pressures, temperatures, and so on. All these quantities are continually changing. If a law changed along with them, no law could be established. But a law expresses precisely those relatively constant relationships within whose boundaries changes in

these variable quantities occur; it represents the constant dependence of one change on another, for example, volume on temperature, and so on.

The connection between changing phenomena and the constancy of law is vividly illustrated by the following example. The standard of living of workers in the USSR fluctuates and rises every year. This demonstrates the fundamental economic law of socialism, which consists of maximally satisfying the ever-growing material and cultural needs of the entire society through the continuous expansion and improvement of socialist production based on advanced technology. The operation of this law, like other laws of socialism, is **a lasting, unshakable** achievement of the Soviet system, testifying to the great superiority of socialism over capitalism.

The strength and stability of a law is expressed in the repeatability of phenomena under similar conditions. The repeatability of phenomena is a manifestation of the regularity of development. Lenin wrote that before the advent of Marxism, "sociologists found it difficult to distinguish between important and unimportant phenomena in the complex network of social phenomena (this is the root of subjectivism in sociology) and were unable to find an objective criterion for such a distinction. Materialism provided a completely objective criterion, identifying 'production relations' as the structure of society, and making it possible to apply to these relations the general scientific criterion of repeatability, the applicability of which to sociology was denied by subjectivists" [8].

Strictly speaking, absolute (in all respects) repeatability does not exist. No two phenomena can be exactly alike. Each phenomenon has its own individuality, its own peculiarity. Based on this fact, neo-Kantians (Windelband, Rickert) deny the regularity of social phenomena. Repeatability reveals the commonality of essential features of different phenomena in some respect.

Metaphysical materialists fetishized laws and portrayed all laws as eternal and immutable. Dialectical materialism asserts that laws cannot change, as, for example, an organism changes from childhood to old age. However, many laws are not eternal; they have a beginning and an end; some laws are replaced by others. Marx and Engels criticized bourgeois economists, including classical political economists, who considered the economic laws of capitalist society eternal and immutable. Marx wrote:

"This is a common misconception among all economists, who regard the relations of bourgeois production as eternal categories" [9]. Engels wrote about the economic laws of bourgeois production: "...For us, none of these laws, insofar as they express purely bourgeois relations, is older than modern bourgeois society" [10].

The duration of the existence of the conditions under which a law operates determines the duration of that law's validity. Many laws of society are short-lived. They operate for a certain historical period, after which they give way to new laws. Some laws of nature also do not exist eternally. Such are, for example, the laws of biology, which arose only with the appearance of life on

earth, in particular the laws of higher nervous activity, which operate only in highly organized matter, i.e., in higher animals and in humans. Those laws of nature that are associated with the fundamental properties of matter are eternal. Thus, Engels considered the law of conservation and transformation of energy in its general formulation to be an eternal and absolute law of nature. Such are the universal laws formulated by the Marxist dialectical method. The most general laws of history also operate throughout the entire existence of human society. I. V. Stalin teaches that "the laws of *capitalist* development, in contrast to sociological laws, which relate to *all* phases of social development, can and must change" [11].

The manifestations and results of laws are entirely **historical**; they vary under different conditions. An anti-historical approach to laws is unscientific. I. V. Stalin's doctrine of the three characteristics of production, while revealing the most general patterns of production development, also contains crucial indications of the specific effects of these patterns in various social formations. In his works on linguistics, I. V. Stalin opposed Talmudism and pedantry, demanding a concrete historical approach to the laws of society. Laws change due to **changing conditions**. Thus, a number of economic laws of socialist society are entirely new laws, having nothing in common with the laws of a capitalist economy. New conditions can limit the application of a law. In this case, the law remains valid, but its manifestation changes. For example, the law of value under socialism remains valid, but its scope of application is strictly limited within certain boundaries. Under a socialist system, the law of value does not regulate production, although it does influence it. In our country, the scope of this law extends primarily to commodity circulation, primarily to the exchange of consumer goods.

The laws of the objective world require certain conditions for their manifestation. Certain chemical reactions occur only at certain temperatures, physiological processes require specific conditions, and so on. The same holds true in society. Thus, the law formulated by Lenin, confirmed by the entire experience of social development, that "revolution is impossible without a nationwide crisis (affecting both the exploited and the exploiters)" [12], points to the fundamental objective condition for the implementation of revolution.

The conditions under which a law operates cannot be separated from the law itself, since the totality of certain conditions essentially constitutes the law's scope of operation; when these conditions change, the law itself changes. A law that operates under certain conditions ceases to operate under other conditions.

"That water is liquid at temperatures between 0 and 100°C," wrote Engels, "is an eternal law of nature, but for it to be valid, there must be: 1) water, 2) a given temperature, and 3) normal pressure" [13].

A correct understanding of the question of what conditions are associated with the operation of a particular law is of great practical importance, since mastering the laws of development consists primarily in the conscious,

systematic and purposeful creation of such conditions under which the law operates in the direction we desire.

Michurin's biology, based on materialistic dialectics, equipped Soviet people with knowledge of methods for developing new varieties of cultivated plants and new breeds of animals. We live in a time, wrote I.V. Michurin, when man's highest calling is not only to explain but also to change the world. The harm of the Morgan-Mendelian school is that, by denying the importance of external conditions for the development of living organisms, it closes the door to practical human influence on this development, condemning science and practice to passively awaiting the random favors of nature.

The possibility of limiting a law's validity to specific conditions is used by modern agnostic indeterminists as an argument against determinism. For example, the English philosophical obscurantist B. Russell writes that since conditions are constantly changing, necessity, strictly speaking, does not exist. Therefore, science, he says, has abandoned the principle of "the same causes lead to the same effects." It's easy to detect an elementary logical error in Russell's reasoning: firstly, if the same causes lead to the same effects, then when the causes change, the effects also change. Consequently, one proposition not only doesn't exclude the other, but confirms it, and science has nothing to reject. Secondly, if conditions changed every moment, both science and practice would be impossible. In reality, each condition exists for a certain period of time, during which a law has time to reveal its effect. Russell falls into absolute relativism, denying any, even relative, stability of phenomena in his attempts to discredit science and "abolish" determinism, and along with it, the law.

Marxist philosophy reveals the general laws of all phenomena; specific forms of interrelationships are revealed by the laws of specialized sciences. Thus, the lawful nature of the interrelationships of chemical elements, discovered by the brilliant Russian scientist D. I. Mendeleev, is that the properties of elements are periodically dependent on their atomic weights. Michurin's biology provided a profound analysis of the laws of living organisms—metabolism, assimilation and dissimilation reactions, etc.

To sum up, it can be stated that **laws are manifestations of the interconnectedness and interdependence** of phenomena in the developing world; they are **essential** connections (relationships) between objects and phenomena of the objective world, which have **a universal and necessary** character and are manifested in relative **stability and repeatability**.

\* \* \*

The laws of science are reflections of the objective in the subjective, that is, reflections in human consciousness of processes occurring independently of human consciousness. Understanding the real laws of nature and society is a historical process in which the mind increasingly reproduces objective laws more adequately, more in line with reality.

A law does not lie on the surface and, therefore, cannot be grasped by sensory perception alone. Its discovery is the result of the theoretical, rational processing of sensory experience. The discovery of a law represents a new stage in a particular field of knowledge, a leap preceded by a long path of research, hypotheses, and understanding of facts. A law of science is an abstraction, a diversion from the concreteness of a living phenomenon or phenomena. "Cognition," says Lenin, "is man's reflection of nature. But this is not a simple, not a direct, not a complete reflection, but a process of a series of abstractions, the formation and elaboration of concepts, laws, etc., which concepts, laws...*encompass*, conditionally, approximately, the universal regularity of an eternally moving and developing nature" [14].

I. V. Stalin revealed with exceptional depth the significance of the laws of science as the results of the abstracting work of thought. Using examples from grammar and geometry, he demonstrated that laws express the relationship of objects (in geometry) or words and sentences (in grammar) without regard to their concrete form, taking what is common to objects and, accordingly, to words and sentences, in their relationships and combinations. By discovering a law, man does not move away from nature, but, on the contrary, draws closer to it. "The abstraction of *matter*, the law of nature, the abstraction of *value*, etc.," Lenin points out, "in a word, *all* scientific (correct, serious, not absurd) abstractions reflect nature more deeply, more faithfully, more **fully**" [15]. Moreover, the more essential and profound the connections between phenomena it reveals, the truer the law.

"*Value* is a category that is "devoid of the substance of sensuality", but it is *truer* than the law of supply and demand" [16].

Only that abstraction is scientific and correct which corresponds to the actual, objective properties of things. Only that law is truly scientific which reflects the truly essential and necessary connections between phenomena. This obvious proposition is disputed and "refuted" by both past and present idealists and agnostics.

By portraying law as an arbitrary abstraction that doesn't reflect the real properties and relationships of phenomena, representing a purely subjective construct created for reasons alien to real objects ("economy of thought," practical benefit, etc.), idealists seek to deprive scientific law of the dignity of objective truth. By declaring scientific law a "simple symbol connecting facts," they let slip that by "facts" they mean thoughts, since a symbol cannot connect real things.

The criterion for a law's scientific validity, as a reflection of reality, is social practice. Until a law is confirmed by practice and experience, it remains merely a hypothesis, a scientific guess. Transforming a hypothesis into a law is a complex process of double verification: on the one hand, its conformity with observed facts, and on the other, with previously established laws, incorporating and "adapting" it into the system of existing laws and theories. This may result in a more or less dramatic change in this system of laws.

I. V. Stalin's proposition that our knowledge of the laws of nature, verified by experience and practice, is reliable knowledge, possessing the significance of objective truths, is confirmed by the entire development of science and technology. Thus, the correctness of the theory of aerodynamics of the father of Russian aviation, N. E. Zhukovsky, is illustrated by the high qualities of Soviet aircraft; I. V. Meshchersky's equations, formulating the laws of motion of bodies of variable mass, for example, jet aircraft, are illustrated by the work of Guards mortars; the theory of the ship in the works of A. N. Krylov is illustrated by the experience of Soviet shipbuilding and navigation; the Soviet synthetic rubber industry is the practical implementation of the theory of the founder of this branch of industry, S. V. Lebedev; the great significance of Michurin's biology is daily confirmed by the practice of state and collective farm construction.

Marxism teaches that consciousness lags behind existence; the laws of science are discovered later than they manifest in objective reality. Comrade Stalin points out that a new process must repeat itself and reach a certain level of development in order to reveal its lawfulness.

The laws of science, while representing objective truths, contain elements of relative and absolute truth. Human consciousness cannot immediately provide **a complete reflection of all** the interconnections and objective laws of reality due to the infinity of nature in space and time, its boundless diversity and development, and the historical limitations of knowledge. Knowledge only ever approaches this goal. However, this does not mean that the laws known do not contain absolute truth. Engels pointed to the absolute nature of all true knowledge. Lenin emphasized the necessary connection between materialism and the recognition of absolute truth.

The unity of the absolute and the relative in laws takes various forms. Some laws, such as the law of conservation and conversion of energy, the law of gravity, and others, are always valid throughout the universe. This is their absolute aspect, but they encompass only some of the connections and properties of nature, not all of them. This is their relative aspect. Every scientific law contains a "seed" of absolute truth that remains unshakable in the development of knowledge. Thus, the principles of organic evolution and natural selection, developed by representatives of Russian and Soviet Darwinism and Michurinist biology, remain fundamentally unshakable achievements of biological science.

The question of recognizing elements of absolute truth in laws is particularly relevant today in connection with the struggle against skepticism and relativism. Contemporary bourgeois philosophy's denial of the existence of a grain of absolute truth in the laws of science aims to substitute "irrationality," faith, even "animal faith"—instinct, and the like—in place of scientific truth, as is done by the obscurantist Santayana and others.

In view of the fact that reactionary philosophers, in order to "refute" the objectivity of knowledge, speculate on the incompleteness of our knowledge, it is necessary to dwell also on the question of so-called exact laws. Only

those laws that are expressed mathematically cannot be considered exact. True, the mathematical expression of a law is one of the indicators and forms of precision. Lenin considered a major success of natural science its approximation "to such homogeneous and simple elements of matter whose laws of motion allow mathematical treatment" [17]. However, the laws of chemistry, Michurin's biology, and the laws of Marxist philosophy, although not expressed mathematically, are quite exact reflections of objective reality. Comrade Stalin, in saying that "the science of the history of society, despite all the complexity of the phenomena of social life, can become as exact a science as, say, biology..." [18], uses the concept of scientific precision in the sense that Marxist historical science provides a correct reflection of the objective laws of social life.

Mathematical methods and the mathematical processing of data have long been used in all sciences, including social sciences (for example, statistics). However, the sciences that study the supra-mechanical forms of matter's motion develop based on their own methods, to which mathematical methods play a subordinate role.

Defenders of the anti-scientific view of mathematics as the "science of sciences" attempt to prove the opposite. Thus, D. Hilbert, one of the modern leaders of mathematical logic, states that "modern astronomy and physics... in their theoretical parts dissolve in mathematics" [19], that "our entire modern culture... finds its foundation in mathematics" [20], that mathematical logic acts as a "general method for the theoretical treatment of natural scientific questions" [21].

Such claims by mathematics and mathematical logic are unfounded and unscientific. Take moral laws as an example. Spinoza expounded ethics using a geometric method. But for Spinoza, this was merely an external form of exposition, not addressing the essence of the matter. No mathematical analysis can reveal, for example, the class essence of the ethical concept of justice.

Dialectical materialism does not deny the role and significance of mathematical methods and mathematical knowledge in general in any field of science. However, one must distinguish between the application of mathematics and the explanation of phenomena through mathematics, the auxiliary role of mathematics from its claims to become a universal scientific method. Mathematics is the science of quantitative relations and spatial forms of the objective world. It studies only certain, yet universal, properties and aspects of things. Therefore, it cannot explain the specificity or qualitative uniqueness of various phenomena.

The exaggeration of the role of mathematics and its methods by idealists and agnostics is an integral part of ideological reaction and aims to transform experimental science into applied mathematics, mathematics into a purely logical science, a product of subjective, "pure" thinking, and logic into a meaningless game of mathematical symbols, a computational technique. Imperialist reaction requires all this to smuggle obscurantism and mysticism

into science and transform science into a tool for the spiritual enslavement of the working masses.

The denial of the importance of the study of facts, the experimental method, and the overestimation of the role of logic is nothing more than an attempt to revive medieval rationalism and scholasticism, a relapse into apriorism, which representatives of mathematical logic only "reform" in order to present it in a veiled form.

Engels' criticism of Dühring's attempts to apply the axiomatic method as a universal one is also directed against modern axiomatists, apologists for mathematical logic. Engels rightly assessed attempts to base the axiomatic method on the understanding of laws as idealism. "This is merely another form of the old, beloved ideological method, also called the a priori method, according to which the properties of an object are known not by discovering them in the object itself, but by logically deducing them from the concept of the object" [22].

\* \* \*

Understanding laws is a complex and contradictory process. As science develops, laws are generalized. For example, Newton's law of gravitation, which he discovered, generalized Galileo's law of falling bodies and Kepler's laws of planetary motion in their orbits. The law of gravitation explained not only the motion of terrestrial and celestial bodies, but also what neither Galileo nor Kepler could explain, such as the perturbations of planetary orbits. Thus, the law of gravitation was not merely a formal generalization but also signified the further development of science.

In physics, there are laws called unified, or generalized, laws. Such, for example, is the law of the gas state, which combines the laws of Boyle-Mariotte, Charles, and Gay-Lussac. At constant temperature, the pressure and volume of a gas are related by Boyle-Mariotte's law; at constant gas volume, the pressure and temperature are related by Charles's law; at constant gas pressure, the relationship between volume and temperature is expressed by Gay-Lussac's law. The unified law of the gas state establishes a relationship between pressure, volume, and temperature as all three quantities change: "The product of the volume of a mass of gas and its pressure is proportional to the absolute temperature of the gas."

Along with the generalization of the laws of science, there is also a division of laws, a narrowing of their scope or content, and a limitation of their sphere of application. "...The limits of truth of each scientific proposition," wrote Lenin, "are relative, being sometimes expanded, sometimes narrowed by the further growth of knowledge" [23].

Thus, the laws of classical physics, with the discovery of the laws of the smallest particles and micro-phenomena, were limited to the macrocosm, i.e., the realm of comparatively large masses and relatively slow movements. The effect of the aforementioned law of value under socialism extends primarily to

the sphere of commodity circulation and, primarily, to the exchange of consumer goods.

An important question in the Marxist-Leninist doctrine of law is the relationship between the laws operating in the various forms of matter's motion. It is well known that each form of motion (mechanical, physical, chemical, biological, social) has its own laws, qualitatively distinct from and irreducible to the laws of other forms of motion. Marxism demonstrated the unscientific nature of attempts to reduce the laws of higher forms of motion to lower ones, or the laws of society to the laws of nature. However, Marxism, approaching this question dialectically, does not separate the laws of various forms of motion with an impassable boundary. The laws of lower forms of matter's motion also exist in higher forms of motion, but not as fundamental laws, but as secondary, limited laws subordinate to the laws of a given higher form of motion, having changed the nature of their action under new conditions. These tenets of Marxist philosophy are confirmed by the findings of advanced science.

Thus, the great Russian scientist K. A. Timiryazev, while studying the assimilation of light by plants, comprehensively uncovered the physical and chemical conditions of this crucial biological process (photosynthesis), thereby dealing a crushing blow to idealism and vitalism in natural science. Timiryazev also demonstrated that photosynthesis is a specific feature of the plant world, a specific product of the vital processes of green plants.

Another remarkable Russian scientist, I. M. Sechenov, demonstrated that all mental activity, influenced by objects in the external world or stimuli emanating from our body, has a physiological, biological basis. He also demonstrated that the human brain possesses specific characteristics. The organ of thought—the brain—as the center of the nervous system, has the ability to detect stimuli, connect them with one another, and transmit them externally. The activity of the nervous system results in specific "products": sensations, ideas, and concepts, as a reflection of objective reality.

I. P. Pavlov, the pride of Russian and Soviet science, provided a materialistic explanation for brain function, demonstrating that behavior and mental activity are based on conditioned reflexes of both simple and complex types. However, he simultaneously established that the mental activity of animals and human thought are qualitatively different. Animals respond only to direct stimulation of the senses, i.e., they possess the first signaling system. Humans, however, possess a qualitatively new, second signaling system—in short, speech. These are stimuli of a specifically human nature.

Using specific material from natural science, scientists have proven the connection and unity between the laws of various forms of movement and, at the same time, the specificity and qualitative difference of these laws, and, consequently, the unscientific nature of reducing higher laws to lower ones.

The flaw in the theory of reducing the complex to the simple lies precisely in its recognition of the possibility of explaining the essence and nature of higher

laws through lower laws. "Every movement is associated with some kind of displacement—the displacement of celestial bodies, terrestrial masses, molecules, atoms, or etheric particles. The higher the form of movement, the more insignificant this displacement becomes. It in no way exhausts the nature of the corresponding movement, but it is inseparable from it" [24].

The hand is a lever of the second kind. Lifting a weight with the hand is accomplished according to the laws of mechanics. But the laws of levers cannot explain the processes that occur in muscles during their contraction, nor the causes of this contraction. The process of digestion has much in common with the physicochemical processes of combustion or putrefaction, but here we are dealing with qualitatively new, far more complex phenomena. "We will undoubtedly someday experimentally 'reduce' thinking to molecular and chemical movements in the brain," writes Engels, "but does this exhaust the essence of thinking?" [25].

Attempts to extend a law beyond its scope, to transfer its effect, in whole or in part, to another, qualitatively different domain, are also unscientific. Reduction theory is, in fact, one form of such unscientific extrapolation. Here's an example. Some modern physicists and mathematicians attempt to extend the conclusions of the theory of relativity regarding the relationship between material masses, space, and time, drawn from the study of a portion of the universe, to the entire universe. As a result of such approaches, reactionary philosophers and physicists make unscientific "discoveries" about the finiteness, the limitations of the universe in space and time, the creation and end of the world, and so on. On the other hand, some physicists and mathematicians attempt to derive all the physical properties of microparticles from the geometric properties of space-time in a gravitational field established by the theory of relativity, ignoring the specific properties of the electromagnetic field.

Engels, criticizing the law of the struggle for existence, exposed Darwin's error, who transferred to the realm of living nature a pseudoscientific theory borrowed from the reactionary economist Malthus and seeking to justify the wolfish laws of capitalism. "Having performed this trick," Engels writes further, "...they again transfer these same theories from organic nature to history and then claim that they have been proven to have the force of eternal laws of human society" [26]. Darwin's error was exploited not only by reactionary sociologists, but also by reactionary Weismannian biologists, who, under the banner of "neo-Darwinism," attempt to idealistically distort Darwinism.

The theoretical basis for all these distortions of the relationship between laws is an abstract metaphysical approach, with which representatives of ideological reaction concoct anti-scientific theories to suit the class interests of their masters. An idealistic distortion of this problem also exists. This is expressed in attempts to "exclude" a particular group of phenomena from the operation of necessity in general. Numerous and varied attempts by idealists to declare the entire realm of social phenomena a sphere of "freedom," not subject to any laws of development. Idealists and agnostics attempt to present the movement of electrons as a matter of their "free will." They argue that

spatio-temporal laws do not operate in the microworld, that the law of causality is not realized in microphenomena, etc. In reality, absolutely all the laws of quantum mechanics include spatio-temporal and causal definitions, expressing them only in a special, unique form in accordance with the characteristics of micro-objects (extremely fast movement and extremely small size of these objects) and the methods of studying the microworld (statistical, "mass" nature of measurement).

Vitalists claim that purposeful adaptations in living nature are not the result of the law of natural selection, but an expression of the "productivity of artistic creativity" of the plants and animals themselves, etc.

All these mystical and fantastical inventions clearly illustrate the harmful influence of ideological reaction on science and the desire of this reaction to turn science into a means of ideological enslavement of workers.

\* \* \*

Knowledge of the laws of the objective world has, above all, practical significance. Satisfying the needs of practice is the ultimate goal of discovering laws, since the goal of all true science is to serve and assist practice. The history of science shows that many laws that seemed to be of purely theoretical interest later found practical application. "The laws of the external world, of nature... are the foundations of *purposeful* human activity" [27].

Modern industrial and agricultural technology is based on the laws discovered by the natural sciences. Using these laws, science creates new substances, new plant varieties, and new animal breeds, modifying their properties. Knowledge of the laws of social development discovered by Marxism-Leninism was a prerequisite for preparing the socialist revolution and the victory of the working class in the USSR. The construction of a socialist, communist society is based on the conscious application of the objective laws of natural and social development.

"The theory of Marxism," wrote V. I. Lenin, "illuminated by the bright light of the new, world-wide experience of revolutionary workers, has helped us understand the entire logic of what is happening. It will help the proletarians of the whole world fighting for the overthrow of capitalist wage slavery to more clearly understand the goals of their struggle, to follow more firmly along the path already outlined, to take victory more surely and firmly and consolidate victory" [28].

Comrade Stalin teaches us that "the party of the proletariat, if it wants to be a real party, must first of all master the knowledge of the laws of development of production, the knowledge of the laws of economic development of society" [29], that every Leninist must be "familiar with the laws of social development, able to use these laws and striving to be an active participant in the political leadership of the country"[30].

Knowledge of the laws of nature makes it possible to systematically transform it for the benefit of workers. The fundamental goal of science is to understand the laws of the objective world. The study of laws is the means by which science deeply penetrates the essence of phenomena and thereby equips practice. Science can serve practice only when it reveals the laws of phenomena. Objective laws represent powerful forces of development. The purposeful use of these forces for the revolutionary transformation of nature and society is the ultimate task and goal of advanced science.

The Party of Lenin and Stalin, relying on Marxist-Leninist science regarding the laws of social development, leads our country along the path to the victorious construction of communism. Our party's scientific policy is based on the application of the objective laws of social development.

Practice determines the direction and nature of the development of scientific theories. In his definition of Leninism, Comrade Stalin emphasizes Leninism's development of the theory and tactics of proletarian revolution and the dictatorship of the proletariat, i.e., those very questions of Marxism whose elaboration is directly linked to the practical tasks of directly assaulting capitalism and building socialism. Lenin wrote that the development of the component parts of Marxist theory was determined by the fundamental tasks facing the proletariat of our country and its party at various stages. Before the revolution of 1905-1907, in connection with the question of Russia's path of development, the task of developing the economic aspect of Marxism came to the forefront; during the first Russian revolution, the task of developing the political aspect of Marxism, the strategy and tactics of the working-class party, came to the fore. After the defeat of the revolution of 1905-1907, a period of "philosophical dismantling" began, with particular attention paid to the elaboration and further development of the philosophical aspect of Marxism.

A close connection between theory and practice is the only true path to understanding the laws of nature and society. Michurin's teaching, based on the principles of dialectical materialism and corresponding to the active, revolutionary-practical spirit of Marxism-Leninism, exemplifies the unity of theory and practice in biology. It is inextricably linked with the practice of the state-collective farm movement, with the solution of important problems of socialist agriculture, and creatively develops Darwin's teachings. "From a science primarily *explaining* the past history of the organic world, Darwinism becomes a creative, *effective* means for the systematic mastery, from a practical standpoint, of living nature" [31].

"By controlling the conditions of the external environment, the living conditions of plant organisms, we can purposefully change and create varieties with the heredity we need" [32].

Knowledge of laws can be used to control them and prevent their undesirable effects. Comrade Stalin, speaking in 1944 and discussing the possibility of Germany attempting to renew aggression after its defeat, simultaneously pointed out the measures necessary to prevent new aggression and, if war does break out, to nip it in the bud and prevent it from developing [33].

I. V. Stalin teaches that people can neither create nor abolish objective laws; they can master the laws of nature and society and use them for their own purposes, limit their scope, and give them a different direction.

Man is a slave to the law if he has not understood it. However, those who have understood the laws are able to master them. Freedom, Engels pointed out, does not consist in acting contrary to objective laws. Such "freedom" is impossible. Freedom is the recognition of necessity. The application and utilization of the laws of nature and social development refutes the assertion that laws are fatal.

The founders of Marxism-Leninism repeatedly pointed out that the correctness of policy is determined by knowledge of the laws of social development and the ability to apply this knowledge to specific issues, and that the resolution of political issues without a scientific basis cannot lead to success. The strength of the Bolshevik Party's policy lies in its scientific nature and adherence to principles, in the fact that, in general and in specific matters, it is based on the scientific application of the objective laws of social development, taking into account the varying effects of these laws under different conditions, and that it is aimed at creating conditions under which the operation of objective laws will best facilitate the achievement of the historical tasks of the working class.

In a socialist society, people gain mastery over their own social relations for the first time. Under socialism, Engels wrote, "the laws of their (people's – Ya. T.) own social actions, which have hitherto confronted people as alien, dominating laws of nature, will be applied by people with full knowledge of the matter and, consequently, will be subject to their domination" [34].

The objective laws of socialist society are consciously taken into account and used in the policies pursued by the Communist Party and the Soviet state—the main, decisive force in the discovery and use of the objective laws of socialist society.

By systematically using the objective laws of socialism, the Soviet people are discovering ever new, ever richer and more diverse opportunities inherent in the conditions of the Soviet system and the natural conditions of the USSR.

The historic victories and successes of the Soviet people, achieved under the leadership of the great party of Lenin and Stalin, demonstrate how the systematic, purposeful, and overcoming of all difficulties scientific and practical use of laws and their management serve the good of working humanity.

The laws of social development are objectively directed against the class goals and interests of the modern bourgeoisie. Therefore, the discovery and application of the laws of social development encounters fierce resistance from moribund, reactionary forces. The desire of reactionary classes to realize their goals and interests contradicts the objective laws of social development.

Attempts by international reaction, led by American imperialism, to isolate the Soviet Union and organize a new war, eliminate people's democratic regimes, weaken the communist and democratic movements in their countries, restore pre-war colonial orders, etc., contradict the objective course of events and the development trends of modern society and are therefore doomed to failure. The struggle of all freedom-loving, democratic, and progressive forces is assuming an increasingly massive and active character. The revolutionary movement of workers, led by a class-conscious proletariat, transforms workers into a subjective, conscious factor in the history of society.

The withering away of the old and the growth of the new is an objective law of development, Comrade Stalin teaches. The irresistible force of this law is expressed, on the one hand, in the intensification and aggravation of the general crisis of the capitalist system, in the degradation and depravity of bourgeois culture, and in the inability of the ruling circles of the imperialist countries to halt the forces that are driving capitalism to its demise. On the other hand, the effect of this law is manifested in the rapid growth and ever-increasing power of anti-imperialist forces, which, under the leadership of proletarian parties, consciously accelerate the withering away of the old and the growth of the new.

[1] V. I. Lenin. Philosophical Notebooks, p. 126. 1947.

[2] Ibid., p. 127.

[3] F. Engels. Dialectics of Nature, p. 186. 1950.

[4] I. Stalin. Questions of Leninism, p. 536. 11th ed.

[5] I. V. Stalin. Works. Vol. 1, p. 340.

[6] V. I. Lenin. Philosophical Notebooks, p. 126.

[7] Ibid.

[8] V. I. Lenin. Works. Vol. I, p. 122.

[9] K. Marx and F. Engels. Selected Letters, p. 223. 1947.

[10] Ibid., p. 172.

[11] I. V. Stalin. Works. Vol. 9, p. 165.

[12] V. I. Lenin. Works. Vol. 31, p. 65.

[13] F. Engels. Dialectics of Nature, p. 189.

[14] V. I. Lenin. Philosophical Notebooks, p. 146.

[15] Ibid.

[16] Ibid., p. 148.

[17] V. I. Lenin. Works. Vol. 14, p. 294.

[18] I. Stalin. Questions of Leninism, p. 544. 11th ed.

[19] D. Hilbert. Article "Naturerkennen und Logik" in the magazine "Die Naturwissenschaften", page 963. 1930.

[20] Ibid., p. 962.

[21] Ibid., pp. 959-960.

[22] F. Engels. Anti-Dühring, p. 90. 1950.

[23] V. I. Lenin. Works. Vol. 14, p. 122.

[24] F. Engels. Dialectics of Nature, p. 44.

[25] Ibid., p. 197.

[26] K. Marx and F. Engels. Selected Letters, p. 306.

[27] V. I. Lenin. Philosophical Notebooks, p. 161.

[28] V. I. Lenin. Works. Vol. 28, p. 456.

[29] I. Stalin. Questions of Leninism, p. 552. 11th ed.

[30] Ibid., p. 599.

[31] T. D. Lysenko. On the situation in biological science, p. 42. 1948.

[32] Ibid., p. 36.

[33] See I. Stalin. On the Great Patriotic War of the Soviet Union, p. 166. 1947.

[34] F. Engels. Anti-Dühring, p. 267.

[https://work-way.com/blog/2019/03/18/o-zakonah-obektivnogo-mira-i-zakonah-nauki/?\\_x\\_tr\\_sl=auto&\\_x\\_tr\\_tl=en&\\_x\\_tr\\_hl=en&\\_x\\_tr\\_pto=wapp](https://work-way.com/blog/2019/03/18/o-zakonah-obektivnogo-mira-i-zakonah-nauki/?_x_tr_sl=auto&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp)