Corresponding Member of the USSR Academy of Sciences

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М. С. СТРОГОВИЧ

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PREFACE

In connection with the introduction of teaching logic in higher educational institutions, there was an urgent need to create a logic textbook that would fully meet the requirements for textbooks for higher education institutions. This task has not yet been solved. This work is only the first step in the preparation of a higher education textbook on logic and does not pretend to be more than just a teaching aid in which the basic material on the course of logic is presented in a popular form, the most necessary information concerning the laws of correct thinking, logical forms of expression and development of thoughts is given.

The main difficulty the author encountered while preparing this book was that many of the fundamental and most important problems of logic have not yet been scientifically developed in our country, a number of questions of logic continue to be controversial, and there are different points of view on the very subject of this science. Of course, one author cannot solve all these questions. This is the reason for the controversial nature of some provisions of this book, and the insufficient development of some questions in it. But the urgent need to give students studying logic a study guide that would contain the most necessary material for a course in logic prompted the author to publish this work in order to at least partially compensate for the lack of a textbook.

Marxist research into the problems of logic gives a materialistic interpretation to logical laws and considers these laws as a reflection in consciousness of various properties and aspects of objective reality. The forms of thinking studied by logic have a necessary, generally binding character precisely because they reflect objective reality and serve the purposes of its correct cognition. This is precisely the interpretation of logic that is given in the present book. The most important question is the problem of the relationship between formal logic and materialistic dialectics. This problem is subjected to special consideration in the present book, but, of course, the author is far from considering the solution he proposes to this question as exhaustive and indisputable.

Due to the nature of the present work, the author was unable to subject contemporary bourgeois logical theories to a detailed analysis. The task of exposing the reactionary, idealistic and formalistic nature of contemporary bourgeois theories of logic, which express the degradation, decline and disintegration of bourgeois science and culture, is highly relevant. This issue should be the subject of special studies by Soviet logicians, but in the present book it could only be touched upon briefly, in terms of a general characterization of the state of bourgeois logic, so as to focus the main attention on a positive presentation of logical material, on the essentially correct resolution of logical questions from our, Soviet positions. But the author dwelled in more detail on one issue concerning modern bourgeois logical theories, namely, on the so-called "logic of relations", in view of the fact that the provisions of this theory are reflected in some works on logic by Soviet authors, and also became known to the Soviet reader through recently published Russian translations of some works by modern bourgeois logicians (Hilbert and Ackerman, Serrus, Tarski). Not having the opportunity in this work to subject the "logic of relations" to a detailed analysis, the author nevertheless considered himself obliged to clearly express his negative attitude towards this theory, which was expressed in the book when examining the so-called "judgments of relations" and "non-syllogistic inferences".

This book also did not provide an account of the history of formal logic, and the author had to limit himself to the most general and brief description of the main stages of its development.

In the exposition of logic, the material on which the application of logical laws is demonstrated is of great importance. It is absolutely indisputable that in the study of logic, wide use should be made of material that is relevant to us, which can be drawn from the diverse, rich Soviet reality, from various areas of socialist construction, from ideological work. The study of logic should help Soviet people in their work, in their lives, in solving their problems, in the struggle against the vestiges of capitalism in the minds of people. The present book makes an attempt to draw on such material. The book cites a number of examples from the works of the classics of Marxism-Leninism. Data from the field of international relations, from speeches of the Soviet delegation at international conferences, in the United Nations, are also used as illustrations in order to show how logic helps to reveal and expose false assertions, vicious concepts, etc.

However, the author understands that he has not yet done enough in this direction.

At the same time, the book also retains many well-known, elementary examples, due to the fact that, for the purposes of popular presentation, it is more convenient to demonstrate the simplest forms of thought using elementary examples.

This book has its own history. It was created at the Military Law Academy, first in the form of processed transcripts of lectures given by the author, then as a teaching aid for students of the Academy, published in two editions (in 1946 and 1948). The first edition (1946) was subjected to a thorough discussion at an open meeting of the Department of Logic and Psychology of the Academy of Social Sciences under the Central Committee of the All-Union Communist Party (Bolsheviks).

The author revised his work several times based on critical comments made by comrades who participated in the discussion or gave reviews, striving to improve his work and eliminate the shortcomings present in it.

The author expresses his deep gratitude to those comrades who took part in the discussion of this work and its previous versions and gave their critical comments, which provided significant and valuable assistance in the preparation of this book.

Author

February 1, 1949

Chapter I. THE SUBJECT OF LOGIC

1. General concept of logic. 2. Thinking and laws of logic. 3. Formal logic. 4. Logic and psychology. 5. The emergence and development of the science of logic.

§ 1. GENERAL CONCEPT OF LOGIC

Logic is the science of the laws of correct thinking. The laws of correct thinking are those laws of expression and connection of thoughts that must be observed so that the development of our thoughts is correct, consistent and systematic, so that when studying and resolving any issue we can draw correct conclusions from the provisions known to us. Researching any issue (scientific, everyday, political, etc.), reasoning on any topic (in an essay, dispute, etc.), we express various thoughts and connect them, deduce others from some thoughts. Expressing any thought, we cite this or that basis in its confirmation, prove the correctness of our statement and challenge the correctness of another, contradictory statement, revealing its falsity. This thought process is subject to certain laws, observance of which makes it possible to come to correct conclusions and cite convincing arguments in their confirmation. On the contrary, violation of these laws brings confusion into thinking. In such cases, the thoughts expressed are not connected with each other, do not follow from each other, the conclusions are unfounded and incorrect, the arguments in support of this or that position turn out to be (unconvincing. If in the process of thinking, when discussing or studying any issue, pondering something or entering into an argument, we adhere to the laws of logic, then we can avoid a mistake, and if a mistake was made, we can reveal it and eliminate its consequences. On the contrary, having made a mistake in thinking and not correcting it, we can come to incorrect conclusions. We can observe this every day. For example, we listen to a report from the field of science or practical activity. Sometimes we notice that the speaker presents the issue unsystematically, jumps from one thought to another; he comes to some conclusion, tries to convince the listeners of the correctness of this conclusion, but the latter does not follow from what the speaker said, is not proven by the data he provided. In such cases, it is discovered failure to comply with the laws of logic.

We often have to argue on various issues, and in arguments we sometimes get confused, we cannot convince either each other or those who listen to the argument. To a large extent, this is a consequence of non-observance of the laws of logic, the admission of logical errors in reasoning.

It is extremely important to observe the laws of logic in scientific thinking, when studying and solving various scientific problems. A scientist who studies any phenomena of reality, studies the laws of nature or social life, deals with a large amount of factual material, which he collects and generalizes. In the process of scientific research, he puts forward various propositions, checks them, discards false and confirmed ones, comes to certain conclusions and proves their truth. Errors can creep into this complex and difficult thought process, expressed both in the fact that the conclusion is made from incorrect, unfounded propositions, and in the fact that when using correct data, the very course of reasoning turns out to be erroneous, inconsistency of thinking is allowed, the necessary connection of thoughts is violated. As a result, the conclusion that the scientist comes to may turn out to be incorrect, erroneous.

Strict and unwavering adherence to the laws of logic is a necessary condition for the success of scientific research. A false theory, an arbitrary statement, an incorrect explanation of the facts and phenomena of nature or social life under study are always associated with logical incorrectness of reasoning, with errors in the development of thought. Of course, the roots of false theories, incorrect conclusions in scientific research are not explained by accidental logical errors made in scientific research — they are much deeper. Thus, the falsity of bourgeois theories in the field of natural or social sciences is due to the viciousness of bourgeois methodology, based on idealistic foundations, and the class interests of the bourgeoisie, which bourgeois scientists serve and which make bourgeois science one of the means of strengthening exploitation and obscuring the consciousness of the working masses. But at the same time, it is necessary to keep in mind that a theory that is false in essence is always incorrect in a logical sense, a false statement is always associated with a violation of the laws of logic. Therefore, while exposing and revealing the falsity of bourgeois theories in the field of philosophy, natural science, sociology, establishing their class nature, their bourgeois-exploitative essence, their non-scientific nature, one should always also reveal their logical incorrectness, violation of the laws of correct thinking, sophistry and the use of vicious logical techniques.

Knowledge and observance of the laws of logic in scientific research is extremely important for Soviet scientists, representatives of advanced science based on Marxist-Leninist philosophy, on the theory of Marx, Engels, Lenin. Possessing the method of materialistic dialectics, serving the people and promoting the noble cause of the destruction of capitalist exploitation and the construction of socialism and communism, Soviet scientists advance science, achieve unprecedented success. Observance of the laws of logical thinking is a significant help in solving scientific problems, contributes to the success of scientific research.

The importance of the laws of logic is no less evident in the everyday thinking of Soviet people than in science. Among bourgeois logicians, a dismissive, lordly attitude toward the thinking of ordinary people, toward the thinking of the people, is very widespread. These logicians classify this as everyday thinking, as philistine thinking, which has no significance for the science of logic. This is where the class essence of bourgeois logic is revealed. But Soviet logicians, of course, approach this issue in a completely different way: for them, the main task is to help Soviet people improve the process of thinking in their life and activities, at work and in everyday life. Following the laws of logic helps people correctly solve practical issues that arise before them and avoid erroneous conclusions in public and personal life. There are no two logics - for scientists and for ordinary people, the laws of logic are the same for everyone, and they are followed, they are guided by Soviet people in all areas of their life and activities.

* * *

V. I. Lenin and J. V. Stalin always attached great importance to observing the laws of logic. All their works are brilliant examples of logical thinking.

Comrade Stalin, speaking about the first speeches he heard from V. I. Lenin (at the Bolshevik conference in Tammerfors in 1905), pointed out their remarkable qualities-inspiration, extraordinary power of persuasion, simplicity and clarity of argumentation.

"But what captivated me then," adds Comrade Stalin, "was not this aspect of Lenin's speeches. I was captivated by that irresistible force of logic in Lenin's speeches, which, although somewhat dry, thoroughly takes hold of the audience, gradually electrifies it and then takes it captive, as they say, without a trace. I remember what many of the delegates said then: "Logic in Lenin's speeches is some kind of all-powerful tentacles that envelop you from all sides with pincers and from whose embrace you have no strength to break free: either give in or decide on complete failure."

I think that this feature in Lenin's speeches is the strongest side of his oratory"[1].

This same feature characterises all the speeches and works of Comrade Stalin, the strength of whose logic gives them an irresistible persuasiveness: not a single word can be omitted from them, it is impossible to break the connection between the arguments presented and the iron necessity of the conclusions that follow from them.

The founders of Marxism-Leninism, relentlessly fighting against the enemies of the working class and against the vulgarizers of Marxism, never missed the opportunity to expose logical errors, violations of the

[1] *J. V. Stalin*, Works, Vol. 6, p. 55.

laws of logic, and contradictions in their thoughts in their reasoning.

Let us give the following example. After the conclusion of the Brest Peace, the so-called “left communists”, who had temporarily seized the Moscow Regional Bureau of the Party, adopted on February 24, 1918, a split resolution of no confidence in the Central Committee, in which they reached an anti-Soviet decision: “In the interests of the international revolution,” the “left communists” wrote in this decision, “we consider it expedient to accept the possibility of losing Soviet power, which is now becoming purely formal”[1].

In response to this, Lenin wrote an article, “The Strange and the Monstrous,” in which he subjected this treacherous resolution to devastating criticism; at the same time, Lenin also pointed out its logical inconsistency. He wrote: “This is strange, because there is not even a connection between the premises and the conclusion.” And further: “No matter how you twist it, there is no logic to be found in the author’s reasoning”[2].

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[1] m. “History of the All-Union Communist Party (Bolsheviks). Brief Course”, p. 208.

§ 2. THINKING AND THE LAWS OF LOGIC

Thinking is the highest form of cognitive activity, representing the process of reflecting objective reality in human consciousness.

Comrade Stalin writes: "...In contrast to idealism, which asserts that only our consciousness really exists, that the material world, being, nature exist only in our consciousness, in our sensations, ideas, concepts, Marxist philosophical materialism proceeds from the fact that matter, nature, being represent an objective reality existing outside and independently of consciousness, that matter is primary, since it is the source of sensations, ideas, consciousness, and consciousness is secondary, derivative, since it is a reflection of matter, a reflection of being, that thinking is a product of matter that has reached a high degree of perfection in its development, namely, a product of the brain, and the brain is the organ of thinking, that therefore one cannot separate thinking from matter without wishing to fall into a gross error"[1].

The essence of thinking consists in the reflection of objective reality in the consciousness of people, in the knowledge of phenomena, things in their essential connections and relationships. Thinking reveals the laws of natural and social phenomena, gives us the opportunity to know the world — nature, society, man. Thinking reflects the external world surrounding a person and serves the purposes of his knowledge and change

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[2] *V.I. Lenin*, Works, vol. XXII, ed. 3, pp. 298, 301.

[1] *J. V. Stalin*, Questions of Leninism, 11th ed., p. 542.

Thinking accompanies us throughout our entire activity. Acting in various circumstances, we think in the process of activity, consider what has already been done, figure out what needs to be done, consider the consequences of our actions. A person always thinks in the process of his waking life, but his thought is especially intense when he studies some question, strives to understand some phenomenon, solves some problem.

The material for thinking is given by sensations, perceptions and ideas. The source of thought is experience, practice, life.

Thinking allows us to know such properties, qualities of objects, phenomena, which cannot be directly perceived, cannot be seen or heard. In this regard, Lenin writes: “Imagination... does not grasp movements with a speed of 300,000 km per second, but thinking grasps and must grasp”[2].

Marx wrote in Capital: “In direct contrast to the sensible, gross substance of commodity bodies, not a single atom of natural matter enters into the substance of their value. You may touch and examine each individual commodity as you please, but its value will remain elusive to you.”[1]

Indeed, a commodity has value, value is a necessary property of a commodity, but this value cannot be perceived by sight or touch, it is accessible only to thought.

Logic studies the laws of correct thinking. What kind of thinking is correct? Correct thinking is that which expresses the truth in a non-contradictory, coherent

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[2] *V. I. Lenin*, Philosophical Notebooks, 1947, p. 199.

[1] *K. Marx*, Capital, vol. I, 1935, p. 11.

and consistent form. Truth is the correspondence of our judgments and statements to objective reality. A true thought is a thought that accurately reflects reality; a false thought is a thought that gives a distorted reflection of reality, affirming something that does not exist in reality, or denying something that does exist in reality. The truth of thoughts is verified by experience and practice.

In order to find the truth, to correctly reflect reality, it is necessary that thinking itself, the work of thought itself, proceed correctly, that each thought be substantiated, that our statements do not contradict each other, that the conclusion to which we come follows from correct initial positions. Sometimes it happens that thinking in one case or another proceeds without the necessary connection, and individual established positions nevertheless turn out to correspond to reality. This is quite possible, but such thinking is not correct; if this or that statement of ours in such a case sometimes turns out to correspond to reality, this happens by chance; in one case the conclusion turned out to be essentially correct, and in another case, under the same conditions, the conclusion may turn out to be false. Consequently, only such thinking is correct, in which a conclusion corresponding to reality is obtained as a result of the correct connection of thoughts. What is necessary for our conclusion, the result of reasoning, the result of the thought process, to be true, i.e., corresponding to reality? For this it is necessary: 1) that those positions which are the initial ones in our reasoning and which in logic are called premises, be true, accurately reflect reality and 2) that the course of reasoning itself, the path of development of thought, be coherent, consistent, substantiated. From false premises a true conclusion, i.e. one corresponding to reality, can only be obtained by chance, as a coincidence, and not as a rule. Violation of the correct course of thought, contradiction and incoherence of thoughts inevitably harm our knowledge of objective reality, deviate our reasoning from the truth.

When the laws of thinking are violated, we can never confidently make a conclusion that corresponds to reality; we can always make a mistake and come to incorrect conclusions. Our thinking relates to various aspects of reality; it is directed at various objects and phenomena. Various aspects of the surrounding world—phenomena of reality, things, events—are studied by various sciences—natural and social. The subject same logics is itself thinking, human thought itself; logic studies the laws that correct thinking follows, according to which our thoughts must develop so that our conclusions represent fully justified positions, convincing for others.

What are the logical laws that correct thinking follows?

The logical laws that we will study further are not invented, they are inherent in human thinking, since they represent a reflection in human consciousness of certain properties and aspects of objective reality.

Lenin wrote: "...human practice, repeating itself billions of times, is fixed in human consciousness by figures of logic. These figures have the durability of prejudice, an axiomatic character precisely (and only) due to this billion-fold repetition"[1].

Thus, the laws of logic are not imposed on human thinking, they represent a necessary property of human thought, conditioned by the fact that objective reality is reflected in human thoughts. A person who has never studied logic and has no concept of it, nevertheless usually thinks logically, in accordance with the laws of thinking. But this unconscious adherence to logical laws is associated with the fact that sometimes, under the influence of various reasons, the natural course of thinking deviates from these laws, allows them to be violated, which leads thinking astray and leads a person to incorrect conclusions. The study of logical laws, their conscious observance, self-control of a thinking person in relation to the very process of his thinking and critical verification of its results can protect against errors in thoughts, detect errors already made, develop discipline in thinking activity, and improve the apparatus of thinking.

§ 3. FORMAL LOGIC

The subject of logic is the laws of correct thinking, i.e. the laws that thinking must follow in order to be consistent, coherent, and sequential, so that the conclusions obtained as a result of the thought process are true and correctly reflect objective reality. Thinking is directed at various objects depending on what is being studied; logic studies the properties of thought

[1] *V. I. Lenin*, Philosophical Notebooks, p. 188, see also p. 164. (An axiom is a proposition accepted as true without proof of its truth.—M. S.)

itself and the conditions that thought must observe in order to be correct.

Due to the fact that logic studies the forms of thinking of various contents in which the development of thoughts occurs, it is called formal logic.

Bourgeois logicians usually give the concept of formal logic such a meaning as if it is not at all interested in the truth of judgments and conclusions and their correspondence to reality, but is concerned only with checking the formal consistency and sequence of thoughts, regardless of whether these thoughts are essentially true or false. In this sense, “formal logic” acquires the character of “formalistic logic,” divorced from the tasks of knowing objective reality.

Such was the medieval scholastic logic; in this sense, logic was developed in modern times by the German idealist philosopher Kant (1724-1804), and such an understanding of it is widespread in modern bourgeois philosophy. Whether the initial positions (premises) from which conclusions are drawn are correct or incorrect, whether these conclusions correspond to reality—this question, in the opinion of bourgeois logicians, does not interest formal logic, which is concerned only with the formal correctness of reasoning, the formal consistency of thoughts, even if the thoughts themselves are false or simply absurd.

Of course, we do not understand formal logic in this sense and give it a completely different meaning—the meaning of a necessary condition for correct thinking and, consequently, for cognition of reality. Formal logic is formal not because it is indifferent to the content of our thoughts, not because it is contentless, but because it reveals and studies the forms of thought in which various contents, various aspects and properties of objective reality are expressed. Objective reality is reflected in human thinking, and logic studies the forms of thinking in which this reflection occurs. Objective reality is diverse, its phenomena have various aspects and properties, on which the forms of thinking depend. Therefore, the forms of thinking are always connected with its content and represent a reflection in human consciousness of various aspects and properties of objective reality. Human thoughts are true when they correctly reflect reality, and false when they incorrectly reflect reality. Formal logic, by studying the forms of thought, promotes the correctness and truth of thinking and thereby helps in cognition of reality. Therefore, the task of formal logic is not to formally correctly connect our thoughts regardless of whether they are true or false, but to teach how to correctly express true thoughts and from true thoughts to draw true conclusions, eliminate false statements , and come to correct conclusions. The name of the logic we are studying, formal logic, also has the meaning that it indicates its appearance from dialectical logic, from materialistic dialectics, which will be discussed below.

§ 4. LOGIC AND PSYCHOLOGISTS

The subject of logic is human thinking, its laws. But thinking as a form of human mental life is also studied by another science — psychology.

Psychology is the science of the laws of mental activity , the mental life of man. Psychology, like logic, studies the laws of thinking. There is a close connection between these sciences, but there is also a difference.

The difference between logic and psychology is twofold. Firstly, the difference between logic and psychology is that logic studies only the laws of thinking, whereas psychology studies the laws of all mental activity of man, i.e. not only thinking, but also sensations, emotions, will, etc. Secondly, the difference between logic and psychology is that although both of these sciences study the laws of thinking, they study different laws.

Psychology studies human thinking as a natural process of mental activity in the form in which it actually occurs. The subject of psychology is the mental life of a person, the connections and patterns of mental phenomena. Thinking is considered and studied by psychology as a phenomenon of mental life along with and in connection with other mental phenomena.

Logic approaches the study of thinking differently; it studies the laws of correct thinking, i.e., those laws that ensure the correct expression and development of thoughts, the correctness of deriving some thoughts from others, and the truth of the conclusions obtained. Logic formulates those laws of thinking that must be observed in order for thinking to be correct, achieving the goals of cognition of reality. It happens, that we reason incorrectly, draw unfounded conclusions, incorrectly connect our thoughts, and this process of thinking can be psychologically quite understandable and explainable. But logically such thinking is not correct, it is incorrect thinking, which does not achieve the goals of cognition of reality. When studying any logical law (we will study these laws in detail later), someone can always say: “but I do not think like that, but quite differently”, and this may be true. But this does not in the least deprive the laws of logic of their necessary significance. Human thinking that deviates from the laws of logic is psychologically quite explainable, but it is incorrect, erroneous, and leads to false, unfounded conclusions.

§ 5. THE ORIGIN AND DEVELOPMENT OF THE SCIENCE OF LOGIC

The word “logic” is an ancient Greek word. It comes from the word “lego”, which means “to speak”, “to explain”, “to think”, and from the related word “logos”, which means “word”, “thinking”, “reason”.

Logic is an ancient science; its roots go back to the 5th century BC. The emergence of logic is associated with the following circumstances. In the 5th century BC in ancient Greece there was a fierce struggle between the aristocracy and democracy. The struggle ended with the victory of slave-owning democracy. The victory of democracy entailed a rapid flourishing of political life, culture, science; the art of public speaking, conducting scientific debates, and debating various issues of politics, social life, and philosophy were especially valued at that time. Logic, at the very first stage of its emergence, was created as a practical guide for conducting disputes, discussions, and polemics. This guide, or the art of conducting a dispute, polemics, bore the familiar name of dialectics in ancient Greece. But dialectics at that time meant something completely different from what it means now when we talk about dialectics, dialectical development, and dialectical thinking.

Comrade Stalin speaks about the origin of the concept of dialectics:

"Dialectics comes from the Greek word "dialego", which means to conduct a conversation, to conduct a polemic. In ancient times, dialectics was understood as the art of achieving truth by revealing contradictions in the opponent's judgment and overcoming these contradictions. In ancient times, some philosophers believed that revealing contradictions in thinking and the clash of opposing opinions was the best means of discovering truth. This dialectical way of thinking, later extended to natural phenomena, turned into a dialectical method of knowing nature, which considered natural phenomena as eternally moving and changing, and the development of nature as a result of the development of contradictions in nature, as a result of the interaction of opposing forces in nature" [1] .

An art of debate was widely used in ancient Athens. The usual order of debate was as follows. Two people argue about something philosophical or another question; they argue in the square, in the market, in the open air, in the presence of many people who are attentively watching how the dispute proceeds, who will win in this dispute. A clear idea of the application of this dialectic can be formed from the dialogues of the philosopher Plato (427-347 BC)[2]. Plato presented most of his works in the form of a description of the sheaves that his teacher Socrates led with the sophists and with the followers of other teachings on various philosophical questions, for example, what is knowledge, what is good, can vice be useful, etc. The dispute always began with one of the disputants putting forward some position, and the other — the opposite to it. One disputant asked the other questions, trying to get the second to agree with some of his statements, made logical conclusions, forcing his opponent to come to conclusions that contradicted what this person had previously asserted. Thus, if one of the disputants managed to reveal contradictions in the other's judgments, he would be the winner in the dispute. Such dialectics often degenerated into sophistry, empty wordplay, wordplay. But the significance of such disputes was still very great: through discussion, discovery of contradictions in thoughts and their elimination, thinking itself was improved, its methods were developed and tested.

The great ancient thinker Aristotle in the 4th century BC subjected the rules of thinking, forms of judgments and inferences to detailed study and thus created the science of logic.

Aristotle formulated the main laws of correct thinking and developed the rules for drawing conclusions from accepted initial positions—premises—what is called deduction in logic. Aristotle is called the "father of logic." Aristotle considered logic no longer as a simple art of debate, although he also dealt with these issues, but as an instrument of scientific knowledge, the study of reality. Aristotle's logic had as its goal the satisfaction of the needs of science, scientific knowledge, in the form and within the limits in which it was created and developed in the ancient world, under the conditions of the slave system.

In the Middle Ages, Aristotelian logic was very widespread, and medieval scholars developed various methods of logic in detail; they wrote a number of

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[2] *Plato* is an idealist philosopher, a representative of the slave-owning aristocratic reaction.

voluminous, cumbersome, painstakingly compiled works on logic. But medieval logic was distinguished by its scholasticism; in many ways, it meant a step back compared to Aristotle's logic. Aristotle developed logic as a system of rules for scientific thinking in order to achieve knowledge of the world. Medieval logic deviated from this correct goal and went down the path of scholasticism.

The word "scholasticism" comes from the Latin word "schola", which means school. The name scholasticism was used to describe the philosophy taught in medieval schools. Due to the nature of this philosophy and its teaching, scholasticism came to be used to describe formal, lifeless, and detached thinking. At that time, philosophy occupied the position of "theology's handmaiden", and saw its tasks not in understanding the world, but in bringing various fields of knowledge into line with the dogmas of the Catholic religion. Therefore, logic in the Middle Ages developed rules of thinking, with the help of which various church dogmas were substantiated. Medieval scholasticism adopted Aristotle 's logic only from its formal side and threw out everything valuable that was in it, namely, its focus on understanding the world, and subordinated this logic to the tasks of theology. This was the class essence of medieval scholastic logic — to serve theology, to strengthen religion and subordinate science to it. Religion itself in the Middle Ages was the main ideological tool in the hands of the feudal class for strengthening feudal social relations, for subordinating the peasant masses to the feudal lords, for hindering free scientific research that could shake the authority of the church. Logic at those levels served theology, substantiating church dogmas and developing the conclusions that followed from them for human behaviour. Such was the position of logic in the Middle Ages and its relationship to the Catholic, which represented a powerful and influential organization of the feudal class.

With the development of bourgeois social relations and bourgeois ideology and with the growing needs of bourgeois society, trends began to emerge that considered logical laws as a means of scientific research in various fields of knowledge (primarily in mathematics and natural science). In this regard, the research of the philosopher Descartes (1596-1650), especially his "Discourse on Method", was of great importance. In the Jansenist[1] corporation of Port-Royal, Descartes' followers developed the manual "Logic, or the Art of Thinking", which at that time represented a valuable study (it is usually called "Port-Royal Logic"). Later, logic was developed in the idealistic philosophical systems of Leibniz, Kant, and others. Logic in the works of these philosophers was distinguished by features of extreme formalism, especially in Kant, who considered formal logic as a science of forms of thinking, indifferent to the content of thinking and to the truth of the thoughts themselves, connected according to the rules of logic.

At the beginning of the 19th century, the bourgeois concept of formal logic acquired a very definite form. Formal logic is interpreted as a science of bare forms of thinking, not only unrelated to the content of thinking,

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[1] *Jansenism* was a religious movement of the 17th century that was opposed to the official Catholic Church and served as an ideological weapon of the French bourgeoisie at that time.

but also independent of the objective world, of the laws of nature and society. The laws of logic are interpreted as laws that have a basis only in thought itself, not determined and not conditioned by objective reality. In other words, formal logic is understood in the sense of *formalistic logic*.

The development of experimental sciences (physics, chemistry, biology, etc.) had a strong influence on the science of logic. The flourishing of experimental science in modern times put forward the task of developing logical techniques suitable for studying natural phenomena, for discovering connections and patterns in natural phenomena. The development of logical techniques used in the study of natural phenomena began during the reign of medieval scholasticism by Roger Bacon (13th century). Francis Bacon (16th-17th centuries) subjected these techniques to a complete and systematic development. The set of such techniques was called induction, the essence of which consisted in methods for establishing general provisions, laws based on the generalization of studied particular cases (facts, phenomena). Further development and systematisation of logical techniques of experimental research were carried out by the English idealist philosopher John Stuart Mill (1806-1873), who introduced a special section of induction into the system of logic.

This trend in bourgeois logic did not change the nature of science itself. Although connected with the development of natural science, bourgeois formal logic in its inductivist version relied on that trend in bourgeois idealistic philosophy which is called positivism. Positivism represents one of the varieties of idealism and reduces human experience to the sum of subjective sensations and ideas. Therefore, both deductive and inductive forms of thinking developed by bourgeois logicians are considered in their studies in an extremely abstract, metaphysical manner; the interpretation of these logical forms by bourgeois logicians is idealistic, and to the extent that these forms are considered in application to the study of natural phenomena, bourgeois logicians do not go beyond crude and narrow empiricism.

In the 19th and 20th centuries, logic was the subject of numerous studies; there are a number of logic courses that examine in detail the laws of logical thinking and their application to individual branches of scientific logic. A characteristic feature of the studies of bourgeois logicians is that the examination of logical laws is based on idealistic philosophical systems, as a result of which the interpretation of both the very foundations of the science of logic and individual logical laws is fundamentally flawed, idealistic and metaphysical. Thus, Mill's study of logic, "A System of Syllogistic and Inductive Logic" (first published in 1843), is based on the philosophical principles of positivism. Many works on logic are based on the idealistic philosophy of Kant and his followers (neo-Kantianism); such is, for example, the course of logic by A. I. Vvedensky (last published in 1922). Steward's extensive treatise "Logic", volumes I and II (Russian translation 1908, 1909), examines logical laws in the spirit of psychologism, i.e. sees in them an expression of only the subjective properties of human consciousness, and not a reflection in consciousness of the objective properties and relationships of the phenomena of reality.

The extreme inconsistency of bourgeois philosophical systems, characteristic of modern bourgeois philosophy, the reactionary nature of this philosophy find their expression in the development of problems of logic by bourgeois philosophers. This is often manifested in taking formalism in logic to its extreme limits, in interpreting logical forms in such a way that they turn out to be indifferent not only to the content of thinking, but also to any meaning in general, as a result of which logical conclusions can be completely meaningless, as long as they are derived according to certain rules. Sometimes the concepts used in reasoning, inferences, are considered as conventional symbols that have no real content, and all logic is reduced to various operations with such symbols. Sometimes an open break with "traditional", "classical" logic, with the "logic of Aristotle" is proclaimed, and a rejection of the system of logical rules tested by the thousand-year experience of mankind is made, attempts are made to create supposedly new logical systems, which are in fact empty and meaningless, devoid of any significance for practice. Sometimes logic is identified with mathematics, sometimes with linguistics (the science of language).

Characteristic is the desire of a number of modern bourgeois logicians to deprive logical laws of any connection with reality, to treat these laws as conditional, artificial rules, like the rules of a card game. If the old bourgeois idealist philosophers overestimated formal logic excessively, considering it the only method of cognition, then some new bourgeois philosophers are inclined to reject formal logic in general; they preach "alogism", consider the laws of logic to be restrictive, burdensome for thinking, which supposedly should rely on direct contemplation, irrational intuition. In this direction in logic, the decay, the decline of bourgeois philosophy, rejecting the goals of genuine knowledge and the demands of human reason, is especially clearly visible. Bourgeois logic, like all bourgeois philosophy, has a class character, pursues the goal of preserving the bourgeois social order, based on the exploitation of the working class and all workers. By treating logic as a science of forms unrelated to objective reality and indifferent to it, bourgeois logicians strive to distract people from genuine scientific knowledge, to obscure their consciousness, and to make it difficult to understand reality. Modern bourgeois logic is reactionary, like all bourgeois idealistic philosophy. With a completely serious , scientific air, bourgeois logicians connect and combine judgments between which there is no connection in content (for example, “if 2 X 2 = 4, then snow is white”), and derive logical propositions that are alien to normal human thinking. In general, bourgeois logic is characterized by the same decline in which all bourgeois philosophy finds itself.

In Russian science, in the works of leading scientists and thinkers, there is much that is valuable for the science of logic: in the great representatives of Russian classical philosophy, for example, in A. I. Herzen and N. G. Chernyshevsky, as well as in the remarkable Russian teacher K. D. Ushinsky. There are also separate original special studies on logic, for example, by M. I. Karinsky.

Marxist research into logic is based on the fundamental principles of Marxist philosophy, on the statements of the classics of Marxism-Leninism about formal logic, and proceeds from the materialistic interpretation and explanation of formal logical laws.

The task of Marxist research into logic is to define the limits and conditions of application of the laws of formal logic and its relationship with materialist dialectics, to free this science from all idealistic distortions, to single out in it those rules and laws of thinking that are truly necessary for correct thinking, that express the objective properties and laws of phenomena of reality, that are justified by experience and practice, and that contribute to the goals of true knowledge. Exposing the reactionary essence and unscientific nature of bourgeois logical theories and decisively eliminating the possibility of their borrowing, their influence on Soviet research in the field of logic are an extremely important task of the Soviet science of logic.

The tasks of the Soviet science of formal logic will be examined in more detail later (Chapter III of this book) after we have become familiar with the basic laws of logical thinking and have obtained a clear understanding of formal logic itself, the character and method of this science.

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We have defined logic as the science of the laws of correct thinking. Let us move on to examining those laws that characterise correct thinking and underlie correct thinking.

Chapter II. BASIC LAWS OF LOGICAL THINKING

1. The concept of the basic laws of thinking. 2. The law of identity. 3. The law of contradiction. 4. The law of the excluded middle. 5. The law of sufficient reason. 6. General characteristics of the basic laws of thinking.

§ 1. THE CONCEPT OF THE BASIC LAWS OF THINKING

The subject of logic as a science are the laws to which thinking is subject and which must be observed in order for thinking to be correct. These laws are varied and relate to various thought processes, but they do not represent a simple accumulation of random, unrelated rules; they are an expression in human consciousness of certain properties and relationships of reality, and therefore form a unity. At the basis of all these laws, relating to various aspects of thinking, to its various spheres, to its various forms, lie some of the most general, main laws of thinking, determining the character of logic as a science and formulating those basic conditions that correct thinking meets.

These basic laws of logical thinking express the simplest and most general properties and relationships inherent in the phenomena of reality. There are four such basic laws of thinking: 1) the law of identity, 2) the law of contradiction, 3) the law of the excluded middle, and 4) the law of sufficient reason. Let us consider each of these laws separately.

§ 2. THE LAW OF IDENTITY

The law of identity is formulated in this way: *in the process of reasoning about any object (subject) of our thought, it is necessary to keep in mind one and the same object, which must be considered as it is, and it cannot be replaced by another object*.

The law of identity is denoted by the formula:

$$A \text{ is } A \text{ , or } A=A.$$

That which our thought is directed at, that which we perceive, that which we think about, that which we examine, but about which we express judgments, is called the object or *subject of thought* . The object or subject of thought can be any phenomenon of reality — a thing, an event, a property or state of a thing, etc. The law of identity asserts the identity of any object (subject) of thought to itself in the process of reasoning about it.

The identity of the subject of thought means the following. When any subject is being studied, researched or discussed, it should not be replaced by another subject in the process of thinking. When arguing about any subject, the same subject should always be kept in mind; the disputants may express different opinions about a given subject, give different explanations for it (usually this is the essence of any dispute), but they must argue about exactly the same subject, they must have in mind the same object of thought, otherwise the dispute will not lead to any results. Therefore, any discussion, any dispute has as its necessary condition the precise establishment of the subject of the dispute, discussion. This applies fully to any disputes, discussions of scientific and political issues.

Let us give an example. In their fight against Marxism, anarchists resorted to all sorts of distortions of Marxism, attributed all sorts of absurdities to Marxism and then refuted these absurdities invented by them and pretended that they had refuted Marxism. Thus, anarchists attributed to Marxists the assertion that "food determines ideology," and triumphantly refuted this position with the consideration that in such a case "some gluttons would be geniuses." Regarding such "criticism" of Marxism by anarchists, Comrade Stalin wrote:

"But tell me, gentlemen: where, when, on what planet and which Marx said that *'food determines ideology'?* Why have you not cited a single phrase, a single word from Marx's works to support your statement? True, Marx said that the economic situation of people determines their consciousness, their ideology, but who told you that food and economic situation are one and the same? Don't you really know that a physiological phenomenon, such as food, determines the economic situation of people? It is forgivable, say, for some schoolgirl to confuse these two different phenomena, but how could it happen that you, the 'destroyers of social democracy', the 'revivers of science', so carelessly repeat the mistake of schoolgirls?"[1]

The anarchists' reasoning is a sophism, a trick used to discredit Marxism. It is, of course, not simply a logical error, but, like any false reasoning, it is also

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[1] J. V. Stalin, Works, Vol. 1, pp. 325-326

logically erroneous. This logical error in this case consists in the violation of the requirement of the law of identity—identity of the subject of dispute in any discussion: the subject of dispute is the economic situation of people as a force determining their ideology, and the anarchists replaced the economic situation with an entirely different subject—food—and refuted the assertion they themselves had made up.

The requirement of identity of the subject of thought finds its expression in any thought process. Each phenomenon, each thing can have many features and properties. In our judgments about these phenomena and things, we can pay attention to some or other of their properties. But in all these cases, we attribute all these properties to one and the same thing, to one and the same phenomenon. This means that in the process of thinking we can pay attention to different properties of one and the same object, but we will attribute them to one and the same object.

We study some object, we analyse it, we examine it from all sides, we pay attention to one of its properties, then to another. But at the same time, the object we are studying remains, is preserved, we must not lose sight of it, we must not replace it with another object.

A violation of the law of identity occurs when, in the process of studying, researching or discussing any issue, we imperceptibly leave the original subject of our thought and move on to another, thinking that we have in mind the same subject as before.

For example, we discuss some action of a certain person, argue about whether it is right or wrong, good or bad, legal or illegal. In the process of discussion, we examine this action from all sides, analyse it, give various arguments to support the assessment of this action, and then it sometimes turns out that in the heat of the argument we have imperceptibly changed the topic of the argument, i.e. we are no longer talking about this action, but about other actions of this person or in general about his personality, his behaviour, etc. It is quite possible that due to the circumstances of the issue under discussion it is really necessary to change the topic of the argument, but: then this is already a different question, and we need to be aware of it and agree that further study, further argument relates not to what we started with, but to something else. Having changed the topic of discussion, we must again observe the law of identity in relation to this new topic, i.e. consider this particular subject, and not any other. Otherwise, the subject of our thoughts will be vague, and it will be impossible to come to correct conclusions about it.

Another example. In a ministry, the activities of a subordinate institution or enterprise for a certain period of time are being discussed, and not all of the activities of this institution or enterprise are being discussed, but only some part of them. If we strictly adhere to the law of identity, then only a certain part of the activity of the institution or enterprise and only for a certain period of time is subject to consideration. Of course, it may be necessary to cover the previous period of activity for comparison, in order to show the improvement of the work; it may also be necessary to touch on other aspects of the activity of this institution or enterprise in order to show the specific weight of this part of the activity in the general system of work. If such an expansion of the framework of the discussion is carried out in order to better clarify the object under consideration, and the latter is not lost from sight and remains the same in the process of discussion, there will, of course, be no violation of the law of identity. But if, during the discussion, other aspects or other periods of the activity of the institution or enterprise begin to be considered in essence, and the original topic is lost among the new questions, then there will be a clear violation of the law of identity, which will entail unacceptable ambiguity: the activity that was subject to discussion and evaluation will remain unclear to the fullest extent, other aspects and periods of activity, the discussion of which was not prepared, will also remain unclear, the entire discussion will not lead to clear and well-founded conclusions about the achievements and shortcomings of the work of the institution or enterprise.

In some areas of state activity, the basic idea of the law of identity even receives legislative expression. Thus, in judicial activity, when a court considers criminal cases, the law requires that the trial not go beyond the consideration of the charge that was originally brought against the accused and for which the accused was brought to trial; equally, a court verdict can only be issued with respect to those actions of the accused for which he was previously charged. Thus, when a case is considered by a court, the subject of the trial is determined and recorded in advance, and the court cannot expand this subject in the same session, cannot go beyond the charges previously brought against the accused. Of course, this requirement of the law is not based on formal logical grounds at all, but is conditioned by the considerations that the accused must know in advance what he is accused of, and he must be given the opportunity to prepare for his defence in court. But this same requirement, from a logical point of view, is nothing more than an application of the law of identity, namely, the preservation of the identity of the subject of the study during the trial.

The identity of the subject of thought means the certainty and constancy of the subject of thought during the thought process: we develop our thoughts about a certain subject, and until its consideration is completed, we do not change this subject, but preserve it.

But any subject of our thought may undergo some changes in the course of time, and our thought may be occupied with examining the change, the development of this subject. In this case, the identity of the subject of our thought consists in the fact that we examine, study the changes of one and the same subject and in these changes we do not lose sight of precisely what is changing; the subject changes in the course of time, and we examine the changes of precisely this, and not of any other subject.

Let’s explain with an example. We have known a person, for example citizen Ivanov, for many years. Over these years Ivanov has changed significantly: before he was young, now he is older; during this time he received a higher education; his job changed, his appearance changed, his character changed, new features appeared, etc. This means that Ivanov has changed over these years, but despite all these changes we are talking about Ivanov and should not confuse him with Petrov or Sidorov: despite all the changes, he is still the same person, the same face.

We study the biography of a writer, scientist, thinker, for example, the great Russian writer Leo Nikolayevich Tolstoy. It is clear that L. N. Tolstoy, who became a writer, is not just Tolstoy the child, but

Tolstoy in the last years of his life, in his views, interests, worldview, was significantly different from Tolstoy during the period of writing War and Peace or Anna Karenina. And yet, this is L. N. Tolstoy in all the changes of his life and his work; we study how he developed and changed, and not anyone else.

Thus, when studying a changing object of thought, we must always keep in mind 110 what is changing, i.e., again this object, and not something else.

However, it may also happen that in the process of changing a given object of thought it will cease to be itself, the change will acquire such a qualitative character that the object will become different. Then we will be dealing with another object, and this other object in the process of reasoning about it will in turn again be identical to itself in all its changes until it disappears, turns into another object, etc. We can give the following example. One type of motion can pass into another type of motion, for example, mechanical motion can pass into heat; mechanical motion can change, but until it passes into heat, it remains mechanical motion in all its changes, and we speak of it as mechanical motion, and not of any other. When it passes into heat, we will speak of it as heat, no matter how this heat changes. Thus, *the law of identity expresses that relatively unchangeable thing that remains in the object of our thought in all its changes, while this object continues to exist as something definite*.

It is not always easy to recognize and preserve in our consciousness the identity of the object of our thought, both because this object has many different properties and is subject to change over time, and because this object is given to our consciousness in various combinations with other objects, in different settings. We saw a given person in one setting, and after a long time we saw him in another setting, among other people, and it is not always easy to know whether it is the same person. We lost something and after some time we find this thing in the possession of another person and demand its return. But we will be able to get this thing only when its identity with the thing that we lost is established.

Of course, the very establishment of the identity of a person and a thing is not carried out in a formal-logical way, but the very formulation of the question of the identity of a person or a thing is based on the logical law of identity; without this logical law, the very question of the identity of a person or a thing would be impossible.

From the above it is clear that the law of identity does not at all assert that any object always remains unchanged. Such a metaphysical interpretation of the law of identity is incorrect, and it is constantly admitted by bourgeois logicians. The law of identity speaks only of the immutability of the object of thought in the process of reasoning, which gives thinking the necessary certainty and precision, but does not at all exclude change, development of objects and phenomena of reality.

Furthermore, regarding one and the same subject we can have different thoughts, which express our different attitudes towards this subject, different evaluations of it, indications of its different properties, etc. But for correct thinking it is necessary that the concepts used in studying the subject or in arguing about it have the same meaning and are not used in different, dissimilar meanings. This means that *during* *one and the same thought process one and the same concept must designate one and the same object of thought.*

There are concepts so simple and clear that their content is understood by everyone in the same sense. Such are, for example, the concepts of everyday life — “table”, “chair”, “paper”, “pen”, “clothes”, “razor”, etc. But many concepts are very complex, having different meanings, so it is possible that one person puts one content into them, relates it to one object, and another person puts another content into the same concept, relates it to another object. For example, the concept of “good faith” can be interpreted differently by different people. If we are considering the question of whether a given person is conscientious, whether he treats his duties conscientiously, then it is necessary that when discussing this issue we understand the same thing by good faith. If one person understands conscientiousness only as the fulfilment of what is required by the relevant instructions and orders, and another - also as the manifestation of initiative, energy (when, as they say, a person “puts his soul into the matter”), it will be impossible to come to a consensus. It is clear that before talking about the conscientiousness of any person, it is necessary to clarify exactly what we understand by conscientiousness. Another example. Sometimes they say about a person: “he is a formalist”, and begin to discuss whether he is really a formalist or not. In order to come to any specific conclusion, it is necessary to establish what is understood by the word “formalist”, and, discussing the issue of this person, to invest this concept with a certain content. A formalist is considered to be a person who treats a matter superficially, without delving into the essence of the matter, soullessly, in a bureaucratic manner, so that what results is, as Lenin said, "something formally correct, but in essence a mockery..."[1] But sometimes a formalist is groundlessly called a person who strictly observes the laws and demands the same from others, who does not agree to break the law, to deviate from it. It is very easy for such a person to get the nickname of a formalist from those who consider the observance of laws an empty formality, who think, as Comrade Stalin said, that "party and Soviet laws are not written for them, but for fools"[2].

It is clear that it is necessary first of all to correctly define what is meant by the concepts of "formalist" and "formalism", and then argue whether this or that person is a formalist.

For the fruitfulness of scientific research, the definiteness of the concepts used is of enormous importance: if a scientist uses any scientific concept, it must be precisely defined, it must be taken in one and the same sense, in one and the same meaning. If one concept is taken in one sense in one case, and in another case — in another, or if in a discussion, in a debate, the participants in the discussion put different content into the same concept, give it different meaning, the discussion, the debate will not yield results. An obligatory condition for a correctly formulated dispute is the correct definition of those concepts that are used in this dispute by its participants. Lenin and Stalin pointed out the need for

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[2] V. Stalin, Questions of Leninism, 11th ed., p. 419.
[1] *V. I. Lenin*, Works, Vol. XXVI, 3rd ed., pp. 406-407.

precise definition of concepts in disputes and discussions.

In his article "On the Caricature of Marxism and on 'Imperialist Economism'" (1916), Lenin criticized Kautsky's assertion that imperialism is "only a system of foreign policy" and that a certain economic stage, a stage in the development of capitalism, cannot be called imperialism, and wrote: "Kautsky is wrong. It is, of course, not smart to argue about words. It is impossible to forbid the use of the 'word' imperialism one way or another. But we must clarify the concepts precisely if we want to conduct a discussion"[1] .

Comrade Stalin in his article "We Must Boycott the Meeting!" (1907), examining the question of whether to participate in the proposed meeting of oil industrialists with Baku workers, pointed out that when deciding this question, one must first of all proceed from taking into account living facts and conditions, since under some conditions it may turn out that it is necessary to participate in the meeting, while under other conditions the meeting should be boycotted.

Comrade Stalin writes: "Then, in order to avoid confusion, we must establish in advance the concepts that we operate with"?[2] . Having precisely established the very concepts of "participating" in a conference, "boycotting" a conference, and having examined this issue in essence in the specific conditions in which it arose, Comrade Stalin came to the categorical conclusion: "So, we must boycott the conference!"[3] In these considerations of Comrade Stalin, it is especially necessary to note the combination of the requirement for *a dialectical* approach to resolving political issues,

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[1] V. I. Lenin, Works, Vol. 23, ed. 4, p. 30.

taking into account the specific socio-political situation, with *the logical* requirement for the precise establishment of those concepts that are operated when discussing the issue.

It is easy to see how often the requirement of the law of identity is violated at various international conferences and meetings after the end of the Second World War. Representatives of various bourgeois states continue to talk about the democratization of countries where the fascists had previously seized power, about the denazification of their state apparatus, etc., but they invest these concepts with a different meaning than that which was given to them when, during the war, the corresponding international agreements were adopted between the allied countries fighting against fascist Germany. The persistent struggle of Soviet diplomacy to preserve the adopted agreements logically means the requirement that the concepts specified in these agreements remain identical, the same, and not be replaced by other concepts, only covered up by similar expressions and phrases.

Thus, *the law of identity requires that in the process of reasoning about any subject of thought, this subject remains identical to itself and is not replaced by another subject, and that the concepts that are used in this reasoning are taken in a certain meaning and not given different meanings.*

To these requirements of the law of identity is added another: if any thought is expressed in the process of reasoning, it is this thought that is subject to discussion; this thought must not be replaced by

[3] Ibid., p. 86.
[2] *J. V. Stalin*, Works, vol. 2, p. 81.

another thought, it is precisely about it that one must decide whether it is true or false, and it is from this thought that the conclusions that follow from it must be drawn. This means that the thought expressed in the process of reasoning must be identical, i.e., it must retain its content. Such a guarantee of the identity of thought is often made difficult by the fact that the same thought can have different verbal expressions, can be expressed in different grammatical forms. But thoughts are identical if their content is the same, even if they were expressed in different forms, in different words.

When two people express the same thought, they usually express it differently, expressing it in different expressions. It does not happen that two people who completely agree with each other on something, who have the same opinion on a given issue, express their opinion in exactly the same words; there is always some difference. Consequently, it is possible for a thought to be identical in its various verbal expressions. Therefore, when discussing any issue, when studying any problem, when examining various statements by different people, it is always necessary to find out whether the thought itself is identical in its various verbal expressions or whether the thoughts themselves are different (not identical). There are often cases when it turns out that people, as they say, “argue about words”: in essence, there is no dispute, both disputants agree with each other, their thought is the same, but since they express it differently, an aimless dispute begins.

Furthermore, if one and the same person repeats a thought that he has previously expressed, he will almost never repeat it in the same expressions, with the same words: the thought may remain the same, but its expression will be different. Here too we speak of the identity of a thought in its different expressions. When comparing statements made by someone on the same issue at different times, we must always clarify whether the thought itself has remained identical and only its verbal expression has changed, or whether the thought has changed and is not identical to the one previously expressed. A violation of the law of identity would be both the recognition of thoughts as different, which are in fact identical, only on the basis that they are expressed in different words, and the recognition of thoughts as identical, which are different in essence, even if they are set out in similar expressions.

Insistence on the identity of thoughts that are in fact different is not an uncommon phenomenon in the practice of international legal activity of imperialist states. Sometimes bourgeois diplomats use this method: under outwardly similar formulations they express essentially different thoughts, while at the same time asserting that these thoughts are identical.

Let us give an example. During the discussion of the statute of the Free Territory of Trieste at the Paris Peace Conference, drafts of the statute were presented to the commission on political and territorial issues for Italy by the delegations of the USA and Great Britain. The US draft stated that there would be no "military, naval or air forces of any state" in Trieste, and the British draft stated that there would be "no military, naval or air forces" without adding "any state". V. M. Molotov noted the discrepancy between the texts of these projects, pointing out that "the American project speaks of the armed forces *of individual states*, while the British project speaks of armed forces *in general*." Comrade Molotov asked for clarification—whether there was a real difference between these projects or whether there had been a typo or an inaccuracy in the wording. The US delegate did not give an answer on the merits and denied the difference in the wording of the project. The ideas expressed in both projects were not identical, and the American delegate denied the difference between them, i.e., he insisted on their identity. In reality, in this case, behind the formal violation of the law of identity were hidden attempts by the imperialist powers to turn Trieste into a naval base on the threshold of the Balkans[1].

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We can make the following general conclusion about the law of identity: this law expresses *the certainty of the phenomena of reality* that serve as the subject of our thought; each object is grasped by our thought in the form in which it has taken shape, been defined, and stood out from the totality of other objects. In logical terms, this law represents the property of human thought to single out objects, to consider them separately from other objects. Without this property of thought, thinking itself would be impossible: if objects were not presented to our consciousness as something separate, definite, stable, we would be unable to say anything about these objects, we would be unable to assert anything about them.

The law of identity is the logical basis of every assertion. Every assertion concerning some object of thought is an indication that this object in reality is

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[1] See *V. M. Molotov*, Speeches at the Paris Peace Conference, 1946, pp. 204, 205.

what we assert about it, it is exactly as we say about it. When we say that this board is black, this book is interesting, the weather is fine today, etc. , i.e. when we assert something, we rely on the law of identity, since we indicate that these objects are exactly as they are in reality.

This does not exhaust the significance of the law of identity, since this law is a necessary property of thought and is applied in the entire process of thinking. But it is precisely as the logical basis of an assertion that it finds its direct and definite expression.

§ 3. THE LAW OF CONTRADICTION

The law of contradiction is formulated in this way: *in the process of reasoning about any object (subject) of thought, this object should not be considered as anything other than what it is.*

A is not not—A.

Let's say that A means that this is white paper. Then not-A is not white paper, but, for example, black, blue. We are talking about white paper — this means that this paper is "not not-white", i.e. not black, not blue, not red, etc. This thought is true, which means it is "not not-true", i.e. not false, not erroneous.

This act is moral, therefore it is not immoral.

This object is a plant, which means it is not a plant, i.e. it is not an animal, not an object of inorganic nature, etc.

The law of contradiction is directly related to the law of identity. First of all, the law of contradiction expresses in negative form the same idea that is expressed in positive form in the law of identity: if A is A (the law of identity), then A is not something other than A, i.e. is not not-A (the law of contradiction).

But the meaning, the sense of the law of contradiction is by no means limited to the expression in the negative form of the content of the law of identity. The law of contradiction has its own, independent content, not expressed in the law of identity. The content of the law of contradiction is expressed in the following.

One and the same object of thought cannot be attributed two contradictory characteristics at the same time and in the same sense or relation; one and the same question cannot be answered both affirmatively and negatively—yes and no—at the same time and in the same sense.

If two contradictory characteristics are attributed to the same object, one of them is in any case attributed falsely.

For example, if one and the same person is said to be both kind and unkind, one of these statements will necessarily be false, both cannot be true. If one and the same event is said to have happened and to have not happened, both of these thoughts cannot be true, one of them will necessarily be false. Another example: we know that the state is an organization of class domination, which means it is not true that the state is a non-class or supra-class organization (as bourgeois politicians, sociologists and lawyers claim).

Thus, the essence of the law of contradiction is as follows: *two contradictory thoughts cannot both be true, one of them is necessarily false*.

This is the meaning of the law of contradiction: *it does not allow the existence of contradictory thoughts about the same object in our thinking*.

The very name of this law is conditional, the expression "law of contradiction" may give reason to think that this law allows contradictions in thoughts, legitimizes these contradictions, whereas it excludes them, does not allow them, so it would be more correct to call this law "the law of non-contradiction". But in logic it is customary to call this law the law of contradiction, and we retain this name.

To correctly understand the law of contradiction, it is necessary to keep in mind that thoughts that differ in content are contradictory only when they relate to *the same object at the same time and in the same respect*.

If thoughts that differ in content relate to the same object, but not at the same time and not in the same relation, there may not be a contradiction between these thoughts, and the truth of one thought does not exclude the fact that another thought may also be true.

This paper cannot be white and not white (for example, grey, black). But if the statement that this paper is white refers to what the paper was a month ago, and the statement that this same paper is not white (for example, grey) refers to what the paper is now, there is no contradiction between these statements, since both statements refer to different times. But at the same time and in the same respect it is impossible to say about the paper that it is both white and not white (grey): one of these statements will necessarily be incorrect, erroneous.

It is impossible to say about a given person that he is both smart and not smart, one of these statements will be wrong. But if one statement has in mind the general characteristic of the intellectual abilities and development of a given person, and another statement refers only to the characteristic of a separate act of this person (“a smart person, but in this case he did something stupid”), there is no contradiction between these statements, since these apparently different statements relate to a given person not in the same respect, but in different respects, in different meanings.

This means that two contradictory thoughts cannot both be true; one of them must necessarily be false. And what will the second thought be? True or also false? The law of contradiction does not answer this question; in one case, the second thought will be true, in the other, just like the first, false. The law of contradiction is limited to indicating the obligatory falsity of one of the two contradictory thoughts, leaving open the question of the second thought, which in some cases may be true and in others false, like the first thought. For example, of the two statements “this paper is white” and “this paper is black,” one is necessarily false, since the same paper (at the same time and in the same respect) cannot be both white and black, but it is possible that both statements are false, since this paper is neither white nor black, but blue.

Contradictions of thoughts, not permitted by the law of contradiction, may be different, more or less clear and distinct. There are obvious contradictions of thoughts, when it is clear to everyone that both thoughts cannot be true, one of them is certainly false. This most often happens when one thought directly asserts something, and the other categorically denies it. For example, this person was there and then; no, he was not there and then. A striking example of such an obvious contradiction is the position that in jurisprudence is called alibi (in another place). Alibi means the assertion that the person accused of committing a crime was in another place at the very moment when the crime was committed and therefore physically could not have committed the crime. It is clear that if the truth of the accused's alibi is proven , the falsity of the assertion that the accused committed a crime is thereby proven, since both cannot be true together. Here, as we can see, the law of contradiction appears very clearly.

But often contradictions are less obvious, less distinct, so that it is not so easy to establish the contradiction of two thoughts. But if there is a contradiction of thoughts, both thoughts cannot be true, one of them is necessarily false.

Let us give the following example. In his speech at the plenary session of the Paris Peace Conference on October 9, 1946, Comrade Molotov said the following about the decision of the Commission on Italy on the issue of Trieste: "The decisions of the commission approved the proposals of the Council of Ministers that the legislative and executive power in Trieste be established on democratic principles. But in fact, this decision of the commission introduced such restrictions on both the legislative and executive power elected by the population, and granted such broad powers to establish public order and security in Trieste to the governor appointed by the Security Council that almost nothing remains of the democratic principles in the governance of Trieste." Listing the powers of the governor and pointing out that foreign occupation troops remain in Trieste, Comrade Molotov concludes: "All this does not fit in with the decision of the Council of Foreign Ministers on the statute of Trieste and does not fit in with the democratic world in general."[1]

In the practice of imperialist states in the field of international relations, it is often considered entirely possible to assert one thing and then assert something opposite, without seeing anything inadmissible in this and without recognizing either of the contradictory points of view as erroneous. Thus, there have been cases where representatives of the USA and England at one meeting accepted a proposal, voted for it, and at another meeting spoke out and voted against it, rather unceremoniously making it clear that they were right both there and here[1].

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The law of identity, which we discussed above, expresses the certainty of each separate object of thought, isolated from the totality of all other objects. The law of contradiction expresses the separateness of the objects of our thought, their difference from each other, their disunity in our thinking. In order for objects to be studied, examined, and known, they must be distinguished from each other, not to confuse one object with another, not to ascribe to one object properties that do not belong to it, but to another object.

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[1] *V. M. Molotov* , Speeches at the Paris Peace Conference, p. 131.

[1] *See V. M. Molotov*, Speeches at the Paris Peace Conference, p. 202.

The law of contradiction does not deny those real contradictions which exist in the phenomena of reality and in the struggle of which their development takes place. But the law of contradiction does not allow contradictory thoughts about the objects and phenomena of reality, it excludes the combination of contradictory statements, does not allow the recognition as true of thoughts which both affirm and deny something about the same thing, at the same time and in the same sense . Such contradictions in thinking are inadmissible, they hinder the correct knowledge of reality. In the article “On the Caricature of Marxism and on ‘Imperialist Economism’“ Lenin wrote: “‘Logical inconsistency — provided, of course, that logical thinking is correct — should not exist either in economic or in political analysis.”

Comrade Stalin wrote about the articles of one author (Gallery) about Plekhanov: “The main idea of the Galery articles is that Plekhanov used to say one thing, now he says another, he contradicts himself. What importance! As if this is news! This is not the first time he has contradicted himself. And he is perhaps even proud of this, considering himself the living embodiment of the “dialectical process”. It goes without saying that inconsistency is a stain on the political face of the “leader”, and it (the stain) must undoubtedly be noted”[1] . Further, Comrade Stalin pointed out that the main thing that deserves attention is the viciousness of Plekhanov’s theoretical position, the invalidity of his objections to Lenin. But for us it is interesting to note here the sharp assessment that Comrade Stalin gives to the contradictory nature of Plekhanov’s statements, and

[2] *V. I. Lenin* , Works, Vol. 23, ed. 4, p. 29.

the very clear indication that the contradictoriness and inconsistency of thoughts have nothing in common with the contradictoriness of the dialectical process of development of objective reality. In another case, speaking about the Mensheviks' criticism of Lenin's book "What is to be done?", Comrade Stalin wrote: "True, only yesterday they defended the very idea from Lenin's book that they have attacked today, but what can you do: an opportunist is called an opportunist because he does not hold principle in high esteem"[2].

The law of contradiction is the logical basis of any negation. Any negation is an indication of the incompatibility of one or another feature with a given object, the absence of this feature in a given object, the incompatibility of a given thought with another that is true, the contradiction of one or another thought with reality. Any negation (of anything) is based on the law of contradiction, just as any affirmation is based on the law of identity.

§ 4. THE LAW OF THE EXCLUDED MIDDLE

The law of the excluded middle is formulated as follows: *between the affirmation of something and the denial of the same thing there is no third or middle ground; one of them, i.e. the affirmation or the denial, is true* and *the other is false*.

This same rule can be formulated as follows: *if one thought affirms what another thought denies, then only*

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[2] Ibid., p. 125.

[1] *J. V. Stalin*, Works, Vol. 1, pp. 59-60.

one of these two thoughts will be true, and not any third one.

This rule is briefly expressed in Latin by the formula: tertium non datur, that is, there is no third option.

The formula for the law of excluded middle:

A is either B or not-B.

If some attribute is attributed to an object and at the same time this attribute is denied in this object, then either the object has this attribute or the object does not have this attribute will be true; there can be no other, third, solution: either the object has this attribute or it does not. If one person asserts something and another denies what the first asserts, one of them is right; either the assertion of the first or the denial of the second will be true.

For example, this paper can be said to be either white or not white, one or the other will be true, the paper is either white or not white. If one person evaluates someone’s action as good, and another does not consider this action good, one of these evaluations is correct, since this action is either good or not.

Whatever subject our thought may concern, the affirmation of something and the denial of the same thing always eliminates the possibility of any third solution; either the affirmation or the denial will be true.

Thus, two thoughts, one of which affirms something *and the other denies the same thing, cannot both be true, just as they cannot both be false: one of them will always be true and the other false*.

From the above, one can see the connection between the law of excluded middle and the law of contradiction and the difference between them. Both of them exclude contradictions in thoughts, do not allow the coexistence of contradictory thoughts, this is their connection and similarity. But there is also a significant difference between them, which is associated with the difference in the forms of logical contradictions.

Logical contradictions can be expressed in two forms: 1) two contradictory, incompatible statements regarding the same object and 2) an affirmation of something and a denial of the same regarding the same object. A contradiction can be between *two statements* when two different, mutually exclusive characteristics are ascribed to the same object, and a contradiction can be between *an affirmation and a denial* when some characteristic is ascribed to one object and at the same time this same characteristic is denied in this object. Examples of contradictions of the first type: this action is good and this same action is bad; this paper is white and this same paper is black; this man is tall and this same man is short. Examples of contradictions of the second type: this action is good and this same action is not good; this paper is white and this same paper is not white; this man is tall and this same man is not tall, etc. In a contradiction of the first type, the second thought asserts something different, incompatible with what the first thought asserts. In the case of a contradiction of the second kind, the second thought simply denies what the first asserts, and itself asserts nothing. In relation to contradictions of the first kind, i.e. contradictions between two assertions, the law of contradiction applies, according to which both contradictory thoughts cannot be true, one of them will necessarily be false, but the law of the excluded middle does not apply: both thoughts may be false, and some third thought will be true.

With regard to contradictions of the second kind, i.e. contradictions between affirmation and negation, both laws apply: the law of contradiction, according to which both thoughts cannot be true, and the law of the excluded middle, according to which both of these thoughts cannot be false at the same time; one of them will necessarily be true.

Let us clarify this situation. If one says that this man is tall, and another says that he is short, the second thought not only denies the first, but also asserts something else. Therefore, both thoughts cannot be true, one of them will necessarily be false, but both thoughts may also be false, since this man may be neither tall nor short, but of average height. If they say about this man that he is tall and that he is not tall, one of these thoughts will be true, and the other false, since this man is either tall or not tall. The one who says that this man is not tall simply denies the assertion that he is tall, but instead does not positively assert how tall this man is. The law of the excluded middle is at work here.

If they say about this paper that it is white and that it is black, then both cannot be true, but both can be false, since the paper may not be white or black, but some other colour—grey, blue, brown, etc. In these cases, the law of contradiction applies, but the law of the excluded middle does not apply.

If they say of this paper that it is white and that it is not white, then one of these propositions will necessarily be true and the other false, and there can be no third proposition: the paper is either white or not white; if it is true that the paper is white, it is false that it is not white; if it is false that the paper is white, it is true that it is not white. Here, as we see, the law of the excluded middle is in effect. This happens because the second thought—this paper is not white—simply denies the first thought that this paper is white—but itself does not assert anything, does not indicate what colour this paper is—grey, black, blue, green, etc.

According to the law of the excluded middle, if one thought affirms something and the other denies it, then one of these thoughts will be true and the other false, but *which of these two thoughts will be true and which false, the law of the excluded middle does not say*. This man is either good or not good; one of these two propositions is correct, and which is correct—the law of the excluded middle cannot decide. This event happened or it did not happen, this object is useful or it is not useful—one of these propositions is correct, and which exactly is correct must be established by examining all the facts, the circumstances of the given case on the merits, and then we can come to the correct conclusion. *Therefore, the law of the excluded middle is the logical basis for investigating the truth.* This law sets the framework: this man is either good or not good; this object is either wooden or not wooden; this action is either blameworthy or not blameworthy. One of these propositions is correct. In order to decide which of these propositions is correct, it is necessary to examine the circumstances of the given case on the merits. Thus, the law of the excluded middle is the basis for us to go beyond it and answer this question in essence by examining it.

The law of the excluded middle is of great importance in all areas of scientific and practical activity; it makes it possible, by discarding false thoughts, to dwell on true positions and to eliminate various half-hearted, uncertain solutions.

When a decision has to be made on a particular issue, then if the question is correctly formulated, it can be answered either affirmatively or negatively: should one act this way or not, does such and such an action deserve censure or not, has such and such an event been proven or not proven, is this person fit for the position he holds or not, etc. Of course, what is required here is, first of all, the correct formulation of the question. When the question is correctly formulated, logic demands a choice between an affirmative and a negative answer, indicating that one of these two answers is correct, and not any third one. Such a requirement of the law of the excluded middle is often not to the liking of those who do not seek the right solution, do not admit the mistake they made, but strive, as they say, to get out of the water dry.

An example from the Paris Peace Conference materials can be cited. The Peace Conference on August 30, 1946, ignored the USSR's objections and, at the suggestion of the Greek delegation, decided to include Greece's territorial claims to Albania in the agenda. However, this issue remained unreviewed. The head of the Soviet delegation, V. M. Molotov, asked whether this meant that the conference's decision of August 30 was cancelled. The US delegate replied that the Greek delegation had withdrawn its proposal.

"But there is the decision of the conference of August 30," objected Comrade Molotov. "Does this decision remain in force or is it cancelled? Please explain to us the situation that has arisen." The US delegate tried to avoid answering, repeating his argument that the Greek delegation had withdrawn its proposal. Then Comrade Molotov made his final statement: “The Soviet delegation expresses satisfaction that the conference is cancelling its decision of August 30.”[1] This conclusion of Comrade Molotov was logically impeccable and unshakable: the previous decision of August 30 on the consideration of Greek claims either exists or does not, either it remains in force or does not remain in force, i.e., it is cancelled, there is no third option, and since the conference, contrary to its previous decision, refused to consider Greek claims, it thereby cancelled its previous decision. But such a conclusion was inconvenient for the American delegation, at whose insistence the decision was made to consider the Greek claims to Albania, despite their obvious groundlessness. When the erroneousness of such a decision became clear, the US delegation did not want to admit its mistake and, in order to get out of the situation, violated the elementary requirements of logic.

A gross violation of the law of the excluded middle can be seen in the following fact that took place at the General Assembly of the United Nations in November 1948 during the discussion of the Soviet proposal to ban atomic weapons. The Soviet delegation made a proposal to ban the use of atomic weapons. Representatives of the imperialist states, primarily the United States and England, objected to the Soviet proposal. But not daring to openly declare that they were against banning atomic weapons, they proposed a draft resolution written in ambiguous terms that masked the true intentions of the authors, with the supporters of this draft stating that it

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[1] *V. M. Molotov*, Speeches at the Paris Peace Conference, pp. 206, 207.

“implied” a ban on atomic weapons. This draft received a majority of votes in the First Committee of the Assembly. At the meeting of the General Assembly, the head of the Soviet delegation, A. Ya. Vyshinsky, said the following: “I ask the majority of the First Committee: what are you—for banning atomic weapons or against banning atomic weapons? If your resolution implies prohibition, why don’t you say so clearly and openly so that the peoples of the world will know and thereby help to create the necessary atmosphere of public confidence , or at least take a step in that direction?” [1]

Later, A. Ya. Vyshinsky showed that the draft resolution did not at all imply a ban on atomic weapons. The question was posed clearly: a proposal has been made to ban atomic weapons; one can either agree with this proposal or disagree with it, one can believe that atomic weapons should be banned, or one can believe that atomic weapons should not be banned. Only one of two solutions to the question is possible—positive or negative, “there is no third option” (tertium non datur). The imperialists do not want atomic weapons banned, they expect to use them for their own aggressive purposes, but they dare not declare this openly, since the conscience of the peoples of the whole world demands a ban on this inhuman means of aggression, designed for the mass destruction of the civilian population. Therefore, the imperialists are trying to get away, to evade a decisive answer to this question, they do not want to openly say either yes or no.

The application of the law of the excluded middle is very clearly expressed in jurisprudence (the science of law) and in practical legal (judicial) activity. Legal

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[1] *Izvestia*, November 20, 1948.

precision in applying the law to various life events requires a categorical decision on the existence or non-existence of the fact or event in question. A crime was either committed or not committed, the accused is either guilty or not guilty; in general, any fact that is important for the case is either established or not established—”there is no third option” (tertium non datur). On any issue related to the consideration of a legal case, a decision can be made according to the formula “either-or”, i.e. either yes or no. Marx drew attention to this (“Herr Vogt”). In connection with the trial brought by Marx against the National Gazette, which had slandered Marx and his associates, the editor of this newspaper, Zabel, wrote that some of his statements were found in the facts cited by Marx “rather as confirmation than refutation...” [1] Marx answered: “Rather than what? M [the law] knows only: either- or.” [2] This remark is profoundly correct: from a legal point of view, this or that circumstance is either confirmed or not confirmed, either established or not established.

§ 5. THE LAW OF SUFFICIENT REASON

The law of sufficient reason is defined as follows: every thought can be recognized as true only when it has a sufficient basis, every thought must be justified. The formula of the law of sufficient reason is as follows:

And there is because there is B.

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[2] Ibid.

[1] See *K. Marx* and F. Engels, Works, vol. HI, part G, p. 498.

By sufficient reason is meant an idea which, if recognized as true, obliges us to recognize as true another idea which follows from it. If the recognition of one statement as true obliges us to recognize as true another statement, then the first statement is a sufficient reason for the second statement. For example, I say: “Ivanov is a valiant soldier of the Soviet Army.” You ask: “What is the basis for this statement?” I answer: “Ivanov has repeatedly shown himself to be brave in battle, for which he was awarded an order.” This is a sufficient reason for the assertion that Ivanov is a valiant soldier of the Soviet Army.

Another example: the Constitution of the USSR of 1936 is the most democratic constitution of all that have ever existed or exist now. The truth of this statement is confirmed by the following data. The Constitution of the USSR legislatively establishes the foundations of a socialist society in which there are no exploiting classes, the exploitation of man by man has been abolished, and the working people themselves are the masters of their own lives; all government bodies, from the local Soviet (rural, district) to the Supreme Soviet of the USSR, are elected on the basis of universal, direct and equal suffrage by secret ballot; citizens of the USSR enjoy broad democratic rights—the right to work, the right to education, etc.; material guarantees are established for workers, making it possible to actually exercise these rights. These indisputable and well-known provisions serve as sufficient grounds for the assertion that the Stalin Constitution of the USSR is indeed the most democratic in the world.

A sufficient reason can also be called simply a reason, since if a reason is not sufficient, this means that the truth of a given thought does not necessarily follow from it, and therefore it cannot be recognized as a reason at all. Lenin, summarizing Hegel's Science of Logic, wrote: "It is superfluous to add: *sufficient* reason. The insufficient is not a reason."[1]

The thought from which another thought follows is called the basis, and this second thought, which follows from the first as from the basis, is called the consequence.

A exists because B exists. B is *the basis*, A is *the consequence*. The law of sufficient reason finds its expression in the fact that *every basis has its consequence, and every consequence has its basis*.

Thus, a sufficient reason for any thought is another thought, recognized as true, from which the truth of the first thought follows. But in order to recognize one or another assertion as a sufficient reason for another assertion, it is necessary that this assertion itself, which serves as a sufficient reason, be true, and we can recognize it as true only when it also has its own sufficient reason: *the sufficient reason for any thought must itself have a sufficient reason.*

A exists because B exists. Why does B exist? B exists because C exists. C exists because D exists, and so on.

To what extent will we continue to substantiate our thought, our assertion, if each reason we give requires a reason for itself?

The limits of justification of thoughts and statements are: a) evidence, b) axioms, c) laws.

Obviousness is the correspondence of a statement to immediate perception, the possibility of verifying a statement about a given fact by perceiving the fact

[1] *V. I. Lenin*, Philosophical Notebooks, p. 119.

itself. For example, I say that it is raining now; this message can be confirmed very simply—go outside or look out the window, and if we see that it is really raining, this is quite sufficient grounds for my statement.

This pen is broken, it does not write; try to write with it, you will see for yourself that it is impossible to write — this is sufficient reason.

An axiom is a proposition whose truth does not require proof. Such are, for example, the axioms of mathematics. If, in support of some thought, we can cite an axiom from which our thought follows, this is a sufficient basis for our thought.

A law is a scientifically substantiated expression of the general and necessary connection of the phenomena of reality. If, in support of any thought, it is possible to cite a law of nature or a law of social development from which this thought follows, this is a sufficient basis for this thought.

In each individual case of substantiating our assertions, we do not always need to go to the very last foundation, i.e. to evidence, axiom or law. In each area of scientific research, in each area of our practical work, there are certain principles, provisions, rules that have already been recognized as true, confirmed scientifically and tested by practice, and, consequently, the substantiation of our assertion must be carried out until we reach these provisions, previously established by science or practice.

The law of sufficient reason is a logical expression in our consciousness of the objectively existing causal determinacy of the phenomena of reality, the causal connection of these phenomena. But the relationship of reason and consequence, which constitutes the content of the law of sufficient reason, should not be confused with the relationship of cause and its effect.

The relationship between reason and consequence is the relationship between our statements, our thoughts. The relationship between cause and effect is the relationship between things, phenomena, events. When we speak of reason and consequence, we mean the connection of our thoughts, judgments. When we speak of cause and effect, we mean the connection of phenomena, objects, events.

Cause (causa) is a thing or phenomenon that causes, generates another thing, another phenomenon. That thing or that phenomenon that is generated by another thing, another phenomenon, is called an action.

A gives birth to B. A is the cause, B is the effect.

For example, heating a body is the cause of an increase in its volume, and an increase in the volume of a body is *the effect of* heating it.

The relation of reason and effect is nothing more than the expression in our thinking of the relations between cause and effect that exist in nature and in society between phenomena, events, and things. Often the reason corresponds to the cause, and the effect corresponds to the effect, but sometimes there may not be such a correspondence. For example, I look at the thermometer and say: “The mercury has risen, therefore the room has become warmer.” The basis of the assertion that it has become warmer is the assertion that the mercury in the thermometer has risen; from this latter assertion, as from the basis, I deduce the consequence: therefore, the room has become warmer. But, of course, one cannot say that the rise of the mercury in the thermometer was the cause of the warming in the room.

The causal connection of phenomena, the relationship between cause and its effect will be discussed in detail later (in the chapter on induction). Now we touch on this issue only in passing and briefly, in order to show the connection and difference between the relations of reason and effect and cause and effect.

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The law of sufficient reason is the logical basis for the reliability of our conclusions and, therefore, underlies the proof of the truth of our thoughts.

When we assert something, convince others of something, insist on the correctness of our thoughts and statements, we must *prove* our thoughts and statements, and this cannot be done otherwise than by providing sufficient grounds from which our thought, our statement follows.

And conversely, when a certain position, assertion about some fact, event is true, is accepted by us as correct, we must recognize as true, correct, and the position that follows from it and for which the first position is a sufficient basis. Thus, for example, from the law of uneven development of capitalism in the period of imperialism discovered by Lenin, there necessarily follows the position that socialism can initially win in several countries or even in one, separate country, and cannot win simultaneously in all countries, as was asserted by Marxism for the pre-imperialist period of development of capitalist society. The law of uneven development of capitalism is a sufficient basis for such a conclusion, the correctness of which was confirmed by the practice of socialist construction in the USSR.

Let us give the following example of a clear violation of the law of sufficient reason. In March 1947, the Council of Foreign Ministers of the USSR, the USA, England and France discussed the preparation of a peace treaty with Germany. The USA and England objected to Albania's participation in the preparation of this treaty, although Albania was listed as an allied and associated power in the peace treaty with Germany's former satellite, Italy.

A. Ya. Vyshinsky, recalling that the treaty with Italy stated that Albania could join the treaty and after signing it would be considered one of the allied powers, said the following: "It may be said that this was said only in relation to the Italian treaty. But a principle is a principle. If Albania is recognized as an allied power in a treaty with a German satellite, then there is no reason not to consider it as an allied power in all other cases when it comes to relations with the enemy of Albania and other allied powers." Further indicating that the statement by the US representative that the US does not recognize the Albanian government cannot worry anyone, since the US has repeatedly refused to recognize various governments and then nevertheless recognized them, Comrade Vyshinsky said: "But why are the rights of the Albanian government recognized in the Italian treaty, but not in the German treaty? This circumstance worries me more because it indicates that my partner's logic is failing him, and the lack of logic is a dangerous disease"[1].

The violation of the law of sufficient reason by the US representative here is completely obvious, and it was precisely in disregard for the laws of logic that A. Ya. Vyshinsky accused him.

§ 6. GENERAL CHARACTERISTICS OF THE BASIC LAWS OF THINKING

The four fundamental laws of logical thinking that we have examined are properties of thought that reflect the simplest properties and relationships of objects, things, and phenomena of reality. It is precisely the fact that these laws are properties of thought that determines their unity and connection: these laws are different properties of thought, but they are contained in one and the same thought, and characterise it from different sides. These properties themselves are inherent in thought because they correspond to certain properties of objects, phenomena of reality, reflected in human thinking.

This can be demonstrated using any thought as an example. Let us take such a simple thought: this action of a person is good, deserves approval. Therefore, this action is exactly what it is — good, deserves approval (law of identity). Since it is exactly like this, it is not different, cannot be assessed as bad, deserves censure (law of contradiction). If such an assessment of our given action is disputed, doubted, we must stop at one of two possible solutions: either this action is good, deserves approval, or it is not good and does not

[1] *Pravda*, March 14, 1947.

deserve approval; one of these two solutions will be true, and no other (law of the excluded middle). If we insist that this action is good and deserves approval, our statement will be recognized as true only if in support of it we can cite reasons, indicate such data and facts from which precisely this assessment of this action follows, and no other (law of sufficient reason).

There are as many examples as you like, and in relation to any thought we will see the action of the four laws of thinking: the law of identity, the law of contradiction, the law of the excluded middle, and the law of sufficient reason. The point is that, depending on the structure and content of a particular thought, the action of one or another law of thinking comes to the fore, while the manifestation of other laws may be less noticeable.

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When examining all four laws of thought, it is not difficult to see that they represent formal properties of thought, characterize the forms of thoughts of various contents, in which objective reality is reflected in human consciousness; these are formal—logical laws. But objective reality develops dialectically, the dialectic of nature and social life is reflected in human consciousness, thinking, and knowledge of reality is achieved with the help of the dialectical method, the method of materialistic dialectics. This raises the question of the relationship between formal logic and materialistic dialectics, to the consideration of which we will now proceed.

Chapter III. FORMAL LOGIC AND MATERIALISTIC DIALECTICS

1. Formulating the question of the relationship between formal logic and materialistic dialectics. 2. Dialectical logic. 3. Laws and method of formal logic and laws and method of materialistic dialectics. 4. On "amendments" to formal logic.

§ 1. STATEMENT OF THE QUESTION OF THE RELATIONSHIP BETWEEN FORMAL LOGIC AND MATERIALISTIC DIALECTICS

Formal logic is the science of the laws of correct thinking, its subject is the laws of correct thinking, i.e. thinking that is consistent, coherent, sequential, well-founded and leads to correct conclusions that correspond to reality. Formal logic establishes the necessary conditions for thought, whatever its subject. Without observing the laws of formal logic, thinking cannot be correct, cannot come to correct conclusions, cannot achieve knowledge of reality. But following the laws of formal logic alone cannot ensure knowledge of reality. Following the laws of formal logic is an indispensable condition for knowledge of reality, but it alone is not enough for this knowledge.

For a correct and complete knowledge of reality necessary application only scientific method of studying reality—*the dialectical method, the materialistic method*.

Materialistic dialectics is the science of the general laws of development of nature, society, and thinking. Thus, materialistic dialectics studies the laws of development not only of nature and society, but also of *thinking* . This gives rise to the problem of the relationship between formal logic and materialistic dialectics, since the subject of study of both is the laws of thinking, and for formal logic this is its entire subject, while for materialistic dialectics it is only a part of its subject. The same problem of the relationship between formal logic and materialistic dialectics also arises due to the fact that both formal logic and materialistic dialectics are means, “tools” for knowing reality, serve the purposes of knowing reality, and use certain methods for knowing reality. The method formal logics And method materialistic dialectic are different , but they are both used in the process of cognition and research of the phenomena of reality.

Thus, the question of the relationship between formal logic and materialistic dialectics consists in establishing the scope of application of the laws of formal logic in the process of research and cognition of reality by the dialectical method.

Bourgeois scientists, who study the laws of nature, society, and thought, usually ignore or directly deny the method of materialistic dialectics and apply the method of formal logic, using only its laws; in those cases when they try to think dialectically, they understand dialectics idealistically, not materialistically. Therefore, the research of bourgeois scientists gives a distorted picture of reality. In a number of cases, bourgeois scientists nevertheless came to the correct conclusions in science> and this happened because the most conscientious of them involuntarily, unconsciously, without realizing it, applied the dialectical method, instinctively reaching dialectics in their research.

A Marxist thinks dialectically, for him the dialectical method is the guiding principle in his research, and this is the reason why Marxist science—and Soviet science is Marxist—is an advanced science, achieving unprecedented development and unprecedented results. But science, thinking, and research that apply the method of materialistic dialectics cannot ignore the laws of formal logic, since this would entail errors in thinking and incorrect conclusions about various phenomena of reality.

Obviously, it is necessary to establish the relationship between formal logic and materialistic dialectics, to determine their differences and their connection.

An incorrect resolution of the question of the relationship between formal logic and materialistic dialectics can lead to the most harmful, negative results, can entail incorrect knowledge of reality, a distorted and perverted explanation of it, i.e. lead not to the truth, but to false conclusions. On the contrary, a correct resolution of this question makes it possible to use the laws of formal logic as a means of improving the work of our thought, facilitating knowledge of reality.

§ 2. DIALECTIC LOGIC

The dialectical method of cognition considers the phenomena of nature and society as interconnected, eternally moving, changing, and the development of nature and society as a result of the interaction and struggle of opposing forces. Created by Marx and Engels, developed and enriched by Lenin and Stalin, *materialistic dialectics is a science about the general laws of development of nature, society and thinking.* Engels in his work "Dialectics of Nature" distinguishes between objective and subjective dialectics. Objective dialectics reigns in nature. *Objective dialectics is the development itself, the movement of natural phenomena, social phenomena, development through contradictions, through the transition of gradual quantitative changes into fundamental qualitative ones, i.e. the dialectics of the very development of objective reality, the objective world, nature and society. Subjective dialectics is a reflection in human thinking* of the development through contradictions, *through the struggle of opposing forces that dominates all of nature.* Engels wrote: "The so-called objective dialectic reigns throughout all of nature, and the so-called subjective dialectic, dialectical thinking, is only a reflection of the movement that dominates all of nature through opposites, which determine the life of nature by their constant struggle and their final transition into each other or into higher forms"[1].

And in another place: "...the dialectic of the head is only a reflection of the forms of movement of the real world, both nature and history"[2] .

Thus, we can thus clarify the relationship between objective and subjective dialectics. Objective dialectics is the very development of the phenomena of the objective world—nature and society. Subjective dialectics is the reflection of this development in consciousness, in human thinking, in our concepts and judgments. This *subjective dialectics is what is called*

[1] *F. Engels* , Dialectics of Nature, 1948, p. 168.
[2] Ibid., p. 162.

dialectical logic. Being an analogue of reality, it is therefore the only scientific method of knowing reality.

The Marxist dialectical method received a classical definition in the work of Comrade Stalin "On Dialectical and Historical Materialism". Contrasting materialistic dialectics with metaphysics, Comrade Stalin characterizes the dialectical method with the following four *features* :

" *a*) In contrast to metaphysics, dialectics views nature not as a random accumulation of objects and phenomena, torn from each other, isolated from each other and independent of each other, but as a coherent, unified whole, where objects and phenomena are organically connected to each other, depend on each other and determine each other...

b) In contrast to metaphysics, dialectics views nature not as a state of rest and immobility, stagnation and immutability, but as a state of continuous movement and change, continuous renewal and development, where something always arises and develops, something is destroyed and outlives its time...

c) In contrast to metaphysics, dialectics considers the process of development not as a simple process of growth, where quantitative changes do not lead to qualitative changes, but as a development that moves from insignificant and hidden quantitative changes to open changes, to fundamental changes, to qualitative changes, where qualitative changes occur not gradually, but quickly, suddenly in the form of a jump-like transition from one state to another state, do not occur by chance, but in a regular manner, occur as a result of the accumulation of imperceptible and gradual quantitative changes...

d) In contrast to metaphysics, dialectics proceeds from the fact that natural objects and natural phenomena are characterized by internal contradictions, for they all have their negative and positive sides, their past and future, their dying and developing, that the struggle of these opposites, the struggle between the old and the new, between the dying and the emerging, between the dying and the developing, constitutes the internal content of the development process, the internal content of the transformation of quantitative changes into qualitative ones"[1].

This is materialistic dialectics, which is the science of the general laws of development of the nature of society and thought. The application of the method of materialistic dialectics makes it possible to know the phenomena of reality in all their diversity, in their connection with each other, in their changes and development, with all the contradictions that are inherent in reality and that determine its development.

§ 3. LAWS AND METHOD OF FORMAL LOGIC AND LAWS AND METHOD OF MATERIALISTIC DIALECTICS

The classics of Marxism-Leninism made a clear distinction between formal logic and dialectical logic. Lenin wrote: "Formal logic... takes formal definitions, guided by what is most common or what most often

[1] *J. V. Stalin*, Questions of Leninism, 11th ed., pp. 536, 537, 539.

catches the eye, and limits itself to this... Dialectical logic requires that we go further. In order to really know an object, we must embrace and study all its aspects, all connections and 'mediations'... This is firstly. Secondly, dialectical logic requires that we take the object in its development, 'self-movement' (as Hegel sometimes says), change"[1].

Here two positions are clearly and distinctly expressed: 1) formal logic and dialectical logic are different sciences, 2) formal logic represents the lowest level of knowledge in relation to dialectical logic.

The method of formal logic is characterized by features different from those of the dialectic method. Formal logic, based on the laws of identity, contradiction, excluded middle and sufficient reason, is characterized by the consideration of objects and phenomena of reality in isolation from each other, their consideration in a state of rest, immobility, the elimination of all contradictions that may arise in our judgments and inferences about the phenomena of reality. One might get the impression that formal logic is incompatible with materialistic dialectics, contradicts it, and is excluded by it. At one time, such a view was quite widespread among us, as a result of which the scientific significance of formal logic was denied, its right to exist as a science was denied. This was an erroneous view. Formal logic is not excluded by dialectics, it is only put in its place as a mandatory condition for cognition, thinking, but a condition that does not cover or exhaust the entire process of cognition of reality. Bourgeois idealistic philosophy constantly used formal logic as the basis of

[1] *V. I. Lenin*, Works, Vol. XXVI, 3rd ed., p. 134,

metaphysical thinking and, relying on its laws, excluded from the consideration of reality development, the replacement of the old by the new, the struggle of opposites. Such a metaphysical approach to the cognition of reality is decisively rejected by Marxism-Leninism, and Comrade Stalin with exceptional clarity and certainty opposed dialectics to metaphysics.

The denial of metaphysics does not mean the denial of formal logic; the classics of Marxism-Leninism rejected not formal logic in general, but its metaphysical interpretation and use.

In a certain field of knowledge, formal logic finds its full, unconditional application, and its method sufficient to reach true conclusions. For clarity and popularity, Engels defined this area of knowledge, in which the laws of formal logic operate, as the area of "household use".

"Household use" is a figurative, conventional expression denoting simple, ordinary relationships of things with which a person has to deal in his daily practice, when the objects of our thoughts appear as established, unchanged for a certain period of time, so that about each object we can say that it either exists or does not exist, that it has such and such a property or does not have it, etc.

Lenin wrote about logical "figures" (i.e. about the forms of inferences) that they express "the most ordinary relations of things" [1] and that "human practice, repeating itself billions of times, is fixed in human consciousness by the figures of logic" [2]. Thus, dialectical logic reflects the movement, the development of reality, the struggle of opposites in it, the interconnection and interdependence of the phenomena of reality, and formal logic reflects the simplest relations of objects and phenomena, such relations in which objects and phenomena are considered in the form in which they have developed, have been determined at one moment or another.

In a certain area of knowledge and at a certain level of it, such an examination of the phenomena of reality is entirely natural and satisfies the goals of knowing the phenomena of reality, but in a wider area and at higher levels of knowledge this is no longer enough, following only the laws of formal logic does not make it possible to know the truth, here it is necessary to use the dialectical method.

Engels gives a remarkably clear explanation of the relationship between formal logic and dialectics using the example of the relationship between lower mathematics and higher mathematics. In Dialectics of Nature, Engels wrote about the "fixed categories" of formal logic, "which represent, as it were, the lower mathematics of logic"[1] . This means that formal logic is to dialectical logic what lower mathematics is to higher mathematics. In Anti-Dühring, Engels expresses this same idea as follows:

"Even formal logic is primarily a method for finding new results, for passing from the known to the unknown; the same thing, only in a much higher sense, is dialectic, which, moreover, breaking through the narrow horizon of formal logic, contains the germ of a broader world view. The same relationship holds in mathematics. Elementary mathematics, the mathematics of constant quantities, moves, at least in

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[2] Ibid., p. 183.

[1] *V. I. Lenin,* Philosophical Notebooks, p. 152.

[1] *F. Engels* , Dialectics of Nature, p. 162.

general, within the boundaries of formal logic; the mathematics of variable quantities, the most important section of which is the calculus of infinitesimals, is in its essence nothing other than the application of dialectics to mathematical relations"[2].

Just as higher mathematics, based on the application of dialectics, does not cancel or deprive of its significance lower mathematics, based on the application of formal logic, dialectics does not cancel or deprive of its significance formal logic, the laws of which in the area of "constant quantities", simple, established objects and phenomena retain their full force.

When we need to count objects or measure an area, we will do it according to the rules of lower mathematics and will not be able to do it in any other way. One has only to imagine an accountant compiling a report on the financial activities of an enterprise using higher mathematics, introducing infinitely large and infinitely small quantities, variable quantities, etc., to understand the senselessness of denying lower mathematics on the grounds that it does not cover all quantitative relations and spatial forms. The same is true for formal logic and dialectics. Dialectics examines the phenomena of reality in development, movement, connection and interaction with each other, which does not eliminate the need to examine their simplest relations, to consider them as phenomena that are stable, established, or disconnected over a certain period of time and under certain specific conditions. Moreover, any developing phenomenon can be studied only when we first isolate and examine what is

[2] *F. Engels*, Anti-Dühring, 1948, pp. 126-127.

developing. The connection between phenomena and objects can be studied only under the condition that we isolate and examine separately that between which there is a connection. Contradictory aspects of phenomena and objects can be studied only under the condition that that between which there is a contradiction is first isolated and examined.

Development, change, struggle of opposites, which occur in all of reality, do not exclude a certain relative stability of phenomena, objects, things over a certain period of time. Anything changes, but over a certain period of time these changes are insignificant, imperceptible and unimportant for practical purposes. They occur within a certain limit within one and the same quality. Let us take a glass in our hands. Does it change or not? This glass changes all the time: scratches may appear, the glass may become dull, the use of the glass may change, etc. But until we break this glass, until we use it for certain purposes, it is still the same glass, and the changes that occur in it have no practical significance for us, they are imperceptible and unimportant. Consequently, we cannot say about this glass that it is glass and not glass, transparent and opaque, large and small, whole and broken, etc. in relation to any property, in accordance with the laws of formal logic, we have to say that it exists or does not exist (according to the scheme: yes-no).

This means that as long as the relative immutability of an object is maintained for a certain period of time, the four laws of thought are fully applicable to the consideration of this object—the laws of identity, contradiction, excluded middle, and sufficient reason. We can say about a person: he is either alive or dead. This will be true from the point of view of logic based on the four laws of thought. But we know that the relationship between life and death is much more complex than it seems at first glance. If we approach the study of life and death scientifically, dialectically, we will find that although a person is now alive, processes of dying off are constantly taking place in his body; when a person dies, the vital processes in the body do not immediately cease. However, when we consider the question of the life and death of a given person known to us, it is important for us to establish with complete certainty whether this person is dead or alive. The question of whether a person is alive or dead can only be answered: either alive or dead, i.e., according to the laws of formal logic, but it cannot be said that he is neither alive nor dead, or that he is both alive and dead. If a doctor, when asked whether a given person is alive or dead, answers: yes and no, or neither yes nor no, i.e., deviates from the laws of formal logic, this will be a mockery of common sense, and it is similar to the well-known expression "neither alive nor dead", which is applied to a person who is so frightened that he loses all sense of himself.

Let us give another example. The concepts of morality and ethics do not remain unchanged; they change and develop with the development of society. At different stages of human development, the concepts of morality, of what is good and what is bad, what represents kindness and what is evil, are different, just as these concepts are different in the same era among different classes—the exploiters and the exploited. Socialist morality is essentially different from bourgeois morality. It is possible to understand, study and explain the development and change of moral views only by the method of materialist dialectics, examining moral views in their connection with the entire set of material conditions of life in society. The dialectical method makes it possible not only to establish that what was considered moral and worthy of approval in some social conditions is considered immoral and worthy of censure in other conditions, but also to scientifically explain these differences in moral views. However, when we consider some specific action committed by a person under certain conditions, and want to understand this action, give it a moral assessment, i.e. decide whether it is immoral, unethical or not, we must answer this question in a completely categorical form — yes or no, i.e. according to the rules of formal logic, and we cannot avoid answering this question or give a half-hearted, evasive answer — this is both bad and good. Here the answer must be definite — either yes or no.

Thus, in the sphere of the simplest relations of things and phenomena, the laws of formal logic operate to the fullest extent, and they are sufficient for the knowledge of the corresponding objects.

But at the highest levels of knowledge, when human thought is directed toward the cognition of reality in all the diversity of its phenomena, in all the complexity and contradictoriness of its development, toward the cognition of its laws, toward the discovery of connections and interdependence of phenomena, objects, events, formal logic is not enough; dialectical logic, materialistic dialectics, is applied here. But in this sphere and at these levels of knowledge, where dialectics dominates, does formal logic lose its significance, do the laws of formal logic lose their force? This question should be answered in the negative. Dialectics, in the words of Engels, breaks through the narrow horizon of formal logic, but does not destroy it at all, does not abolish it, and in the area where the cognition of reality is based on the application of the dialectical method. The laws of formal logic, which represent the necessary conditions of human thought, retain their force for dialectical thinking, but only as its simplest conditions, since dialectical thinking is subject to its own laws, which represent a reflection in human consciousness of the laws of development of reality, nature and society.

Dialectical thinking does not contradict the laws of formal logic. It would be a complete distortion of materialistic dialectics to assert that dialectical thinking is illogical, allegedly violating the laws of formal logic. From the greatest masters of dialectical thinking—Marx, Engels, Lenin, Stalin—we learn not only the application of the dialectical method, but also the strict logic of judgments and conclusions.

Dialectical thinking reveals contradictions in objective reality, the struggle of opposing forces, while formal logic, when understood correctly, does not at all exclude these contradictions; it only does not allow contradictory thoughts, statements that are inconsistent with each other, unfounded and inconsistent conclusions and inferences, which are more unacceptable in the field of dialectical thinking than anywhere else.

In order to understand the specific relationship between formal logic and dialectics, we can take any example of a dialectical contradiction in the phenomena of nature and society, and in each case we will see that this dialectical contradiction does not at all cancel the laws of formal logic. Let us show this with the following example.

Marxist-Leninist theory teaches that at a certain stage of social development the state withers away; it will disappear in a fully communist society, when there is no division of society into classes. Comrade Stalin in his report to the 18th Party Congress developed this teaching on the withering away of the socialist state and established that the state under communism will wither away only when the capitalist encirclement is liquidated[1] . This means that when the appropriate conditions arise, the socialist state will wither away. At the same time, the entire policy of the Communist Party and Soviet power is aimed at strengthening and reinforcing the socialist state. Comrade Stalin in his report to the 16th Congress of the All-Union Communist Party (Bolsheviks) said the following on this matter:

"We are for the withering away of the state. And at the same time we stand for the strengthening of the dictatorship of the proletariat, which represents the most powerful and mightiest power of all the state authorities that have existed to date. The highest development of state power in order to prepare the conditions *for* the withering away of state power—that is the Marxist formula. Is this "contradictory"? Yes, "contradictory." But this contradiction is vital, and it fully reflects Marx's dialectic."[1]

So, here is the dialectical contradiction: the socialist state is getting stronger, and this strengthening will serve as a condition for its withering away in the future. In order to establish this position, one must master the dialectical method perfectly. For someone who thinks only formally-logically (either-or, yes-no),

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[1] See *J. V. Stalin*, Questions of Leninism, 11th ed., p. 606.

[1] *J. V. Stalin*, Questions of Leninism, 10th ed., p. 427.

such truth is inaccessible, he will reason approximately like this: “if the state is getting stronger, it means it will not wither away, and if it withers away, it means it is not getting stronger, but weakening.”

But this dialectical contradiction in the development of the socialist state has been established, and established with the help of the dialectical method. Let us see whether it eliminates the effect of the laws of formal logic, and we will see that there is nothing of the sort: the dialectical position under consideration establishes a vital contradiction in the development of social phenomena, but does not allow any contradiction in the course of thought, in the logical substantiation. The socialist state *is now* growing stronger, so that *later* (when the necessary conditions arise) it will wither away. Here the requirements *of the law of contradiction are fully observed;* according to this law, it is impossible to ascribe contradictory properties to one and the same object *at one and the same time and in one and the same respect* . In this case, contradictory properties (strengthening and withering away) are ascribed to the socialist state not simultaneously, but at different stages of development, under different conditions. There is not the slightest deviation from the laws of formal logic here.

Let us give another example that explains the relationship between formal logic and dialectics. In the article “How does Social Democracy understand the national question?” Comrade Stalin wrote:

“I recall the Russian metaphysicians of the 1950s who persistently asked the dialecticians of that time whether rain was beneficial or harmful to the harvest, and demanded a “decisive” answer from them. It was not difficult for the dialecticians to prove that such a formulation of the question was completely unscientific, that at different times such questions should be answered differently, that during a drought rain is beneficial, and in a rainy season it is useless and even harmful, and that, consequently, the demand for a "decisive" answer to such a question is obvious stupidity" [1] .

Metaphysicians think *only* formally and logically, and therefore pose the question of whether rain is useful or useless *in general*. Dialecticians reject such a formulation of the question as unscientific and absurd: in some conditions rain is useful, in others it is useless and even harmful. This question can be correctly posed and resolved only by reasoning, by thinking dialectically. But the dialectical formulation of this question and its resolution do not in the slightest way contradict the requirements of formal logic, and the solution obtained in this way will be correct from the formal-logical side as well. Indeed, in different conditions rain is useful and useless, but in the same conditions it is either useful or useless. During a drought, rain is useful and specifically useful (law of identity), under these conditions it cannot be considered useless (law of contradiction), of two judgments — during a drought, rain is useful and it is useless — the first is true, the second is false (law of excluded middle), during a drought, rain is useful, since it moistens dry soil, preserves crops and gives seeds the opportunity to grow (law of sufficient reason). If someone were to say that during a drought, rain is both useful and useless, this would be a violation of the laws

[1] *J. V. Stalin*, Works, Vol. 1, pp. 50-51.

of formal logic, but it would also be absurd from the point of view of dialectics.

To summarize the above, we can formulate the relationship between formal logic and materialistic dialectics as follows:

1. Formal logic is a science that is different from dialectical logic and represents a lower level of knowledge in relation to dialectical logic.

2. The laws of formal logic represent the necessary conditions of human thought; at the lowest level of knowledge, in the area of ordinary, simple relationships, things, objects, phenomena, these laws are sufficient for the purposes of knowledge.

3. At the highest levels of knowledge, when studying reality in all its fullness, in all the complexity and contradictory nature of its development, the laws of formal logic are insufficient; it is necessary to use the dialectical method, to follow the laws of materialistic dialectics; but even in this area, dialectical thinking does not eliminate, but retains the laws of formal logic as its necessary, but not the only and not the main, but only an elementary condition.

§ 4. ON “AMENDMENTS” TO FORMAL LOGIC

Formal logic is a necessary element of teaching, education, an academic discipline, the study of which is important for every scientific and practical worker.

Lenin pointed out that formal logic should be studied “with amendments” [1] This means that it should not be studied in the form that it took in the works of bourgeois logicians, in bourgeois textbooks on Formal Logic.

Why are only amendments to the already established formal logic needed, and not a new, different formal logic? As has already been pointed out in this chapter, the laws of formal logic are a generalization and reflection in the consciousness of people of centuries-old, endlessly repeated human practice; these are properties of thought that correspond to the simplest, elementary properties and relationships of objects and phenomena of objective reality. Consequently, formal logic is not invented, it exists, its laws operate even in places and among those who do not have the slightest idea of formal logic as a science. These are the laws that need to be studied. And for this it is necessary not to create a "new" formal logic, but the formal logic that exists in life, in practice, to free it from those idealistic distortions and perversions that were introduced into it in the Middle Ages by scholasticism, and in modern times by bourgeois scientists.

Bourgeois philosophers are constantly trying to do away with "classical" formal logic, to create a new formal logic. Under the pretext of the obsolescence of "Aristotelian" logic and its inconsistency with new needs and achievements of science, they discard or devalue the laws of formal logic that have entered the consciousness of the people, justified by the experience of practical everyday life of people, invent new patterns of thinking, new forms, devoid of content, divorced from practice. This path is the path of transforming formal logic into formalistic logic.

Our attitude to formal logic is completely different: the development of science and the revolutionary

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[1] *V. I. Lenin*, Art., vol. XXVI, ed. 3, p. 134.

upheaval that Marxism brought about in science, at every step, give rise not to the need to replace one formal logic with another formal logic, but to the necessity of dialectics, the dialectical method. Formal logic remains in its place. But the liberation of formal logic from idealistic distortions and perversions alone is not enough.

It is necessary to study logical laws from a materialistic, Marxist position, developing and moving forward the science of formal logic.

What amendments should be made to formal logic in accordance with Lenin's instructions?

These amendments are as follows:

1. Formal logic must be put in its place as the science of the necessary, simplest properties of thought; therefore, any attempt to regard it as the only and all-encompassing science of the methods of cognition must be rejected, i.e., its position in relation to materialistic dialectics must be determined.

2. The study of formal logic and scientific research of its problems must be conducted from a materialistic position, freeing formal logic from those idealistic distortions to which it was subjected by medieval scholastics and bourgeois scientists. Its laws must be considered as a reflection in the consciousness of people of the objective properties and relations of reality.

3. Formal logic should be considered as a means of understanding reality, and not as a purposeless game of logical forms, therefore everything that is sterile and artificial, that is not justified by the needs of life, science and practice, should be eliminated from it.

4. Formal logic must be studied and taught using material relevant from the point of view of Soviet

people, using the material of Soviet reality, Soviet life. This material must be such that it is clear how formal logic is a means (not the only one, not the main one, but an important one) for solving the current problems of Soviet science and practice and for exposing and refuting hostile bourgeois views and concepts.

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This is the relationship between formal logic and materialistic dialectics. A brief examination of this issue was necessary for us in order to determine the place of the laws of formal logic in the cognition of reality, in the expression and development of our thoughts, reflecting objective reality. Logic, as we know, is the science of the laws of correct thinking. Human thinking occurs in various forms. The first basic form of thinking is *the concept*. We will now proceed to examine the concept.

Chapter IV. CONCEPT

1. The essence of the concept. 2. Logical methods of forming concepts. 3. Attributes of the concept. 4. Types of concepts. 5. The scope and content of the concept. 6. The relationship between the scope and content of the concept. 7. Relationships between concepts. 8. Naming concepts. 9. On the materialistic nature of general concepts.

§ 1. ESSENCE OF THE CONCEPT

A concept is a form of thinking that reflects and records the essential characteristics of things and phenomena of objective reality.

In order to clarify the essence of a concept as a form of thinking, it should be compared with such forms of mental activity as sensation, perception and representation.

Sensation is the result of the impact of the external world on our sense organs. We see light, distinguish colours: white, red, black, etc. These are visual sensations that reflect the properties of objects perceived by the eye. As a result of the impact of air wave vibrations on our hearing organ, we hear and distinguish sounds — these are auditory sensations. When we touch an object, we feel its softness, hardness, smoothness, roughness, etc. — these are tactile sensations. The same is true for taste and smell. Thus, sensations are a reflection in the human consciousness *of individual sensory qualities of objects* (colour, softness, hardness, etc.).

Lenin wrote: “We cannot learn anything about any forms of matter or any forms of movement except through sensations" [1], and emphasized that "sensations, i.e. images of the external *world*, exist *in us*, generated by the action of things on our sense organs"[2].

A more complex form of cognitive mental activity of a person is *perception* . It can be defined as follows: *perception* is *a direct sensory reflection of reality in the consciousness of a person.* There is much in common between sensation and perception, and this commonality is that both sensation and perception are created in the same way — by the influence of the external world on our sense organs. But through sensation we cognize a separate sensory quality of a particular object, but not the object itself as a unity, and through perception we cognize the entire object, the entire phenomenon as a unity, as something whole. For example, in front of us is a chalkboard. When we look at it, we have a certain complex of sensations — black colour, white lines, etc. But our sensations are created by the individual qualities of this board, while perception encompasses the properties of the object as a whole: we perceive not the disparate properties of the board separately, but the board as a single thing, as a whole.

Unlike sensation, the content of perception is not the individual sensory qualities of objects, but the objects themselves and their totality.

Thus, perception consists of sensations and represents a more complex form of mental activity than sensation. Perception is not a simple sum of sensations, it is not a mechanical addition of sensations, but always represents a more or less complex whole, qualitatively

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[2] Ibid., p. 78.

[1] *V. I. Lenin*, Works, Vol. 14, ed. 4, p. 288.

different from the sensations that comprise it. Reflecting objects, phenomena of reality, perception is always associated with a certain comprehension, awareness of a given object as a whole.

In human consciousness, perception is closely connected with *representation*.

A representation is an image of an object or phenomenon in our consciousness, which we do not perceive at the moment . Sensation and perception exist in a person only to the extent and only for the time that some objects or phenomena act on our sense organs. As soon as this action ends, we will no longer have perception. We see a person — we have his perception; the person leaves — the perception ends. But perception does not disappear from our consciousness without a trace. At the moment we may not see some object, but we can imagine it, because its image has been preserved in our consciousness. This is a representation, i.e. an image of a phenomenon or thing preserved in a person's consciousness, which the person does not perceive at the moment and which does not act on his sense organs at the moment.

What perception and representation have in common is their clarity. Whether we perceive a given object at the present moment or have a memory of it, *a visual image* of this object appears in our consciousness. Thus, a characteristic feature of representation and perception is their *clarity* .

But a representation is not always a simple image of only a previously perceived individual object. A representation can be the result of processing, a combination of images of various, previously perceived objects, so that we can imagine objects, phenomena, which we ourselves have not directly perceived, but the images of which have formed in our consciousness as a result of the combination and processing of elements of various perceptions. For example, we can have a very vivid representation of a tropical forest in Africa, where we have never been, or of a mermaid, a centaur, etc., which do not exist at all, but the image of which can form in a person's consciousness from a combination of elements of actually existing and previously perceived objects. Further, in contrast to perception, a representation can be not only an image of a separate, individual object, but also a generalized image of many similar objects; for example, we have a representation of a river—not only the Volga or the Dnieper, but rivers in general, or a representation of a locomotive, airplane, etc.—not necessarily this locomotive or airplane, but a locomotive or airplane in general. Such representations are called *general representations*. A general representation is also characterized by clarity—it is a visual, albeit generalized image of an object, phenomenon, thing.

Sensations, perceptions and ideas, being images of the external world in the human consciousness, give us the material necessary for thinking.

Human thinking develops on the basis of sensations, perceptions and ideas, but for its implementation it requires a more complex form, which is *the concept*.

The concept is qualitatively different from perception and representation.

Representation and perception, as stated above, are of a visual nature, i.e. they are associated with the image of a specific, concrete thing, object, phenomenon, or group of things, objects, and phenomena. We may have an idea of this river, of this person, i.e. the content of the representation or perception is some single object, some thing, a separate phenomenon, a separate event with all their individual properties. We can also have general representations, i.e. generalized images of many similar objects, but they are also associated with more or less visual images of perceived objects, with their sensory properties that are accessible to our perception. With the help of perceptions and representations, we cognize the reality around us. But this is only the initial stage of the process of cognition. Cognition rises to a higher level due to the fact that as a result of the generalization of a mass of perceived and imagined objects, events, phenomena, facts, *concepts are formed in our consciousness*.

The concept, unlike perception and representation, reflects and records not all the features of objects and phenomena accessible to our senses, but only the essential features identified in objects and phenomena by our thoughts, while the inessential features of objects and phenomena are not included in their concept. Therefore, the concept lacks the clarity that is characteristic of perception and representation, and, unlike them, is not a sensory-perceived image.

I see some object in front of me, for example, a desk — this is a perception. I leave the room and do not see the desk, but its image is preserved in my memory, in my consciousness — this is a representation. In both cases, in my consciousness there is a visual, sensory image of an individual object with all its features. We have seen many desks of the most varied properties — different types of wood, different colours, different sizes, different shapes. We can abstract ourselves from the features, from the individual characteristics of individual desks and single out only what is essential for every desk. Then we create *the concept* of a desk — not this, not that, not another, but a desk in general. In this concept, the various individual qualities of individual objects (in this case, desks) are absent and only what is common and essential to all objects of a given kind is singled out.

The concept is abstracted from the individual characteristics of separate perceptions and ideas and is the result of generalization of perceptions and ideas of an indefinitely large number of homogeneous phenomena and objects. Man, society, war, school, table, chair, diligence, laziness, city, village, chemistry, physics, natural science, science, etc. — all these are concepts. Thinking occurs with the help of concepts, which, thus, are the basic form of thinking.

Lenin pointed out that "concepts are the highest product of the brain, the highest product of matter" [1].

It is in concepts that the basic connections, patterns and properties of things and phenomena of objective reality are reflected in the consciousness of a person, in his thinking.

In each branch of scientific knowledge, concepts are developed that express the subjects studied by a given science and summarize the results achieved by this science.

For example, in the field of socio-economic sciences the following concepts have been developed: productive forces, production relations, socio-economic formation, commodity, money, value, price, production, exchange, social class, capital, consumer goods, base, superstructure, ideology, etc.

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[1] *V. I. Lenin*, Philosophical Notebooks, p. 143.

§ 2. LOGICAL WAYS OF FORMING CONCEPTS

Concepts are formed through such logical techniques as analysis and synthesis, abstraction and generalization.

1. Analysis and synthesis. *Analysis is the mental dissection of an object of thought into its elements, the identification of certain of its characteristics and their examination separately*.

It is impossible to study any more or less complex object without subjecting it to analysis. Each object is given to us in perception with a multitude of all sorts of its features, and when studying it we mentally distinguish all these features, separate them from each other and examine them separately. A fused, undivided perception of the entire object as a whole gives us a general impression of the object, an idea of it, but does not give us real knowledge of this object. In order to know an object, it is necessary to mentally break it down into separate components and examine each one, study it separately. This is especially necessary when studying a group of homogeneous objects and phenomena, similar to each other in some features and differing in others. Analysis is such a mental dissection of the objects and phenomena being studied.

Analysis is a necessary technique for the formation of a concept. We have ideas about similar objects. In order to create a concept about these objects, we mentally dissect these objects, distinguish individual features in them.

Analysis gives us knowledge of individual elements, individual aspects, individual features of the object being studied, but does not give us holistic knowledge, i.e. knowledge of the object as a whole. To obtain such knowledge, *synthesis is necessary* .

Synthesis is *a mental combination of the constituent parts of an object or phenomenon into a single whole, consideration of this object or phenomenon as a certain unity.* If in the process of analysis we mentally break down this or that object of thought into constituent parts, then in the process of synthesis we combine these constituent parts, and we create a concept of the whole object or phenomenon. In order to study a given object as a whole, after an analytical study of the constituent parts, individual aspects, it is necessary to unite, combine, and synthesize the knowledge obtained in this way.

Synthesis is necessary for the formation of a concept, since only in this way, i.e. by means of connection, synthesis, are the features of a concept, identified by means of analysis, connected, linked together, so that for a given object or group of objects we obtain a holistic concept that encompasses the given objects of thought.

2. Abstraction and generalization. The analysis we talked about above is a mental dissection, a decomposition of the object of our thought into its elements, into separate features and an examination of each element, each feature separately. But any object has an infinite number of features, it is impossible to study them all, and there is no need for that: it is important for us to study not all the features of the object, but only those that are significant, that are essential in scientific or practical terms, while the remaining features we can leave aside as inessential, having no meaning. This is achieved by a logical technique called *abstraction*.

Abstraction is a mental selection, a mental extraction from a phenomenon or object of its individual, essential features and leaving them all other signs without consideration.

Abstraction is necessary for the formation of a concept, since from the features identified in objects and phenomena we select individual, essential features, which we combine in a concept, and we abstract from the rest, become distracted, and leave them aside as unimportant for the concept of these objects.

From the above it is clear that abstraction is connected with analysis and is its continuation. In order to abstract, i.e. to be distracted from certain features of a given object, it is necessary to divide, to break down the object of thought into its features, i.e. to carry out an analysis, and to pay attention to some features, to be distracted from others (to be abstracted).

By means of abstraction we single out individual features of the studied objects that are essential, abstracting from the rest as unimportant. By means of scientific abstraction concepts of scientific content are created (for example, labour, value, progress, productive forces, production relations, etc.).

But we can study only individual objects, phenomena, facts, events. The concept covers not only them, but all objects of a given kind, each of which cannot be studied. The extension of the features of the studied objects to all objects of the same kind is achieved by generalization.

Generalization is a mental transition from the features of individual, single objects to the features that belong to entire groups of these objects . We examine a set of individual objects and find in them features that are present not only in each individual object, but in all of them, in the entire group of these objects. For example, studying the properties of a plant of a certain species, we discover common properties, features in all the studied specimens, on the basis of which we make a generalization, noting that all plants of a given species have these features (for more details on generalization, see the chapter on induction).

To form a concept, generalisation is necessary due to the fact that we consider the essential features discovered in the objects we have studied as features of all objects of a given kind, i.e., all objects to which a given concept is applicable.

Summarizing what has been said about the logical methods of forming concepts, we can briefly express these methods as follows.

By means of analysis we distinguish individual features in similar objects and by means of abstraction we single out essential features, abstracting from non-essential features. By means of synthesis we combine essential features and by means of generalisation we extend the obtained complex of essential features to all objects of a given kind.

If a concept correctly reflects objective reality, corresponds to the facts, phenomena of reality, then it is correct, true. But a concept can also be false if it incorrectly reflects reality, distorts, perverts it. For example, all concepts of religious content, superstition, etc. are false. Correct thinking, the laws of which are studied by logic, can use only true, correct concepts.

§ 3. FEATURES OF THE CONCEPT

Since the concept expresses essential features of objects and phenomena, it is necessary to define what a feature is in general and an essential feature in particular and features. *A feature is everything in which objects of thought are similar to each other or in which they differ*. In some of their features, objects are similar to each other, for example, trees are similar to each other in that they all have a trunk. In other features, objects differ from each other, for example, deciduous trees differ from conifers in that they have leaves, while conifers have needles.

In the most general form, the attributes of objects can be reduced to properties (large, small, white, black, good, bad, soft, hard, breathing with lungs, possessing a strong will, etc.), *states* (standing, lying, moving, living, dying, growing, etc.), actions (working, reading, teaching, fulfilling his duties, etc.) and *the results of actions* (achieved success, brought benefit, etc.), etc.

All objects, phenomena, events, in general all objects of our thought have an infinite number of features. But our thought from this infinite number of features of objects selects some that are essential in some respect, and it is precisely these essential features of objects that are expressed in various concepts. In this respect, a concept differs from an idea.

The concept, as has already been said above, does not include all the attributes of an object, but only *the essential ones* ; in the representation, along with the essential attributes, there are also inessential ones. At the same time, some essential attributes may not be given in the representation, since they are cognized only mentally. Thus, cost is an essential attribute of a product, but it is not given in the perception of the product by the senses and in the representation of it. Thus, the attributes of objects, phenomena, events, etc. are divided into *essential* and *inessential* , and only the essential ones are related to the concept.

Essential features are those features that necessarily belong to objects of a certain kind and distinguish them from objects of other kinds. Thus, essential features characterize the corresponding objects and make it possible to know them.

Unessential features are those features that, although present in certain objects of a given kind, do not characterize them and do not make it possible to know these objects and distinguish them from objects of other kinds.

For example, an essential feature of man (as such) is the ability to create tools and means of production; this feature characterizes man and distinguishes him from animals. An essential feature of a commodity is its value, which distinguishes the commodity from any other product of labour.

Irrelevant features are divided into two types: *proper features and improper or accidental features.*

Proper characteristics are those that belong to all objects of a given kind and follow from essential characteristics, but are not themselves characteristics.

For example, all people have two eyes. This is a feature common to all people, and it is called a proper feature, but it is not an essential feature that characterizes people and distinguishes them from other living beings, animals, which also have two eyes.

Random features are those features that may or may not belong to given objects. Thus, the colour of people’s eyes is a random feature: some people have blue eyes, others have black eyes, etc.

A concept expresses only the essential features of the objects it encompasses. But some features of the same objects may be essential in one respect, and others in another respect. Therefore, the same objects may be expressed in different concepts, some of which reflect some features of these objects, and others reflect other features. For example, the physical concept of water will differ from the chemical concept of water. Those features of objects that are essential in some respect and therefore are reflected in a certain concept are called features of this concept. This means that the features of a concept are those features of the objects covered by the concept that are reflected in this concept. The ability to create tools and means of production is an essential feature of man that distinguishes him from other living beings; it is this feature that is reflected in the concept of man, and therefore this feature can be spoken of as a feature of the concept of man. In other words, a feature of a concept is the features of the corresponding objects, reflected in the consciousness of man, in his thinking, the form of which is the concept.

§ 4. TYPES OF CONCEPTS

All concepts can be divided into separate types.

1. Single concepts and general concepts. *A single (individual) concept is a concept that relates to one* *specific object, individual phenomenon, event*. "The War of 1812", "The Great Patriotic War of the Soviet People against the Nazi Invaders", "Vasnetsov's painting "Bogatyrs", "Aristotle", "Moscow", "Nevsky Prospect in Leningrad", etc. — all these are single (individual) concepts. A single concept is very close to a representation, because a representation also relates to some single fact, one phenomenon, but in this case we are talking about a single concept, because we mean only the essential features of a given phenomenon, and not just its visual image.

For example, "Vladimir Mayakovsky" is both an idea and a concept. In the idea we have a visual image of Mayakovsky, as we could get it when we saw and heard him, from memories of him, from his portraits, etc. The concept "Vladimir Mayakovsky" expresses the features that characterize Mayakovsky as a person who "was and remains the best, most talented poet of our Soviet era" (*Stalin*). In the usual process of thinking, cognition, individual concepts are inextricably linked with the corresponding ideas, and they can be separated from each other only mentally.

A general concept is a concept that covers a group (class) of homogeneous phenomena, objects, things. For example, "table" is a general concept that refers to all tables that were, are now and will be in the future. "Man" is a general concept, it refers to all people who have ever lived, are living now or will live in the future. "War", "commander", "state", "planet", "star", "paper", "book" — all these are general concepts. Such a general concept covers an indefinite number of homogeneous objects in the sense that any object that has the characteristics of this concept will fit it. In addition, there are general concepts in relation to which it is possible to precisely indicate all the individual objects to which they relate, to precisely list and count them, for example, “European states”, “planets of the solar system”, etc., since we can list all the European states that exist now, all the planets of the solar system known to us.

Such general concepts in logic are called *registering* general concepts, since they “register,” mark in a generalized form a certain number of homogeneous objects. The difference between such registering general concepts and general concepts that relate to an indefinite number of homogeneous objects is factual, not logical: if a new state is formed in Europe, it will fit under the concept of “European state,” if a new planet is discovered, it will fit under the concept of “planet,” etc., so that in these cases, too, a general concept can be applied to an indefinite number of homogeneous objects.

In logic, general concepts are of primary importance, since thinking takes place in general concepts; it is in general concepts that the properties and relationships of the phenomena of reality that we know are expressed.

When the subject of thought is a single object, the individual concept is necessarily connected with general concepts. For example, the individual concept “Leo Tolstoy” cannot be formed without connection with such general concepts as “writer”, “philosopher”, etc. However, in no case should we underestimate the significance of individual concepts in logic: the properties of human thought, expressed in the basic laws of thinking, are most clearly and distinctly manifested when the object of thought is individual objects, things, phenomena. This is clearly seen when considering the laws of identity, contradiction and excluded middle (see Chapter II).

2. Concrete concepts and abstract concepts. *A concrete concept is a concept that relates to groups, classes of things, objects, phenomena, or to individual things, objects, phenomena.* For example, “table”, “man”, “war”, “state”, “sun”, “goods”, “money”, “book”, etc. — these are all concrete concepts, because they reflect the corresponding concrete objects, phenomena, things.

An abstract concept is a concept about the properties of objects or phenomena, when these properties are taken as an independent object of thought. For example, “price”, “cost”, “valour”, “duty”, “guilt” are all abstract concepts, because they do not treat the objects themselves, but their properties, which are taken as an independent object of thought and are abstracted, abstracted from the objects.

“A brave man” is a concrete concept, since it corresponds to certain objects, namely brave people. “Courage” is an abstract concept, no object corresponds to it, and it expresses the property of objects, but not the objects themselves.

One should not confuse or identify individual concepts with concrete ones, or general concepts with abstract ones. These are different, non-coinciding divisions of concepts. A general concept can be both concrete and abstract. For example, “table” is a general and at the same time a concrete concept. “Table” is a general concept, since it does not refer to a specific individual object, but to all objects of this kind, to all tables; but “table” is at the same time a specific concept, because it corresponds to objects, things — tables. “Courage” is a general and at the same time an abstract concept. “Courage” is a general concept, because it does not refer to the property of an individual person, but to the corresponding property of an indefinite number of people; “courage” is an abstract concept, since it expresses not an object, thing, person, but a property, quality, feature of the corresponding object (person).

In the same way, “Stakhanovite” is a general and specific concept: this concept is general, since it applies to all workers who have demonstrated those qualities and produced those performance indicators that make up the concept of “Stakhanovite”, and at the same time specific, since it applies to specific people. “Stakhanovite methods of work” is a general and abstract concept, since it relates to all methods of work of a special kind, but expresses not specific people, but the properties of their work, which give it particularly high productivity.

3. Collective concepts. Collective concepts occupy a special place among concepts . *A collective concept is a concept that refers to a set, a collection of objects and things, conceived as a single object*. For example, “library” is a collective concept, since it refers to a collection of books. “Forest” is a collective concept, since a forest is a collection of trees. A collective concept differs from a general concept in the following. A general concept refers to many objects in such a way that it also refers to each individual object that fits the given concept. Thus, the concept “mammal” refers to every mammal, the concept “table” — to every table. If I say that mammals are vertebrates, this means that each individual mammal is a vertebrate. A collective concept does not refer to each object, but only to their set. If I say that this forest is tall, this does not mean that all the trees that make up this forest are tall.

One and the same concept may be general in one meaning, and collective in another meaning. For example, “forest” may be a collective concept in relation to the trees of which it consists, but “forest” is a general concept for designating all forests in general. “Library” is a collective concept in relation to the books of which it consists, but “library” is a general concept in relation to all libraries. “Working class” is a collective concept in relation to the workers who make up this class as a whole, and “working class” is a general concept in relation to the working class of different states and different historical periods.

4. Categories. Among concepts, there is a special type called *categories*. *Categories are scientific concepts that reflect the most general properties of objects and phenomena, the most general and essential relationships and connections of reality*. Categories include, for example, the following concepts: “matter”, “motion”, “form”, “content”, “causality”, “freedom”, “necessity”, “essence”. As we can see, these concepts express the most general and essential properties and relationships of objective reality and have philosophical and scientific significance. Lenin wrote: “Matter is a philosophical category for designating objective reality, which is given to man in his sensations, which is copied, photographed, reflected by our sensations, existing independently of them”[1].

§ 5. SCOPE AND CONTENT OF THE CONCEPT

In every concept, its volume and content differ.

The scope of a concept is all objects and phenomena to which the given concept can be applied.

For example, the scope of the concept "people" is all people who have ever lived, are living, or will live. The scope of the concept "tree" is all trees, i.e. all objects that are covered by the concept "tree" fit under it. These are all general concepts. The scope of an individual concept is only one object to which this concept relates. For example, the scope of the concept "Moscow" is one city bearing this name, the capital of our homeland.

The volume of general concepts is expressed in the form of a class.

A logical class is a set of objects that have common characteristics that are inherent to them all, as a result of which these objects are covered by a general concept.

In other words, a class is all the objects that make up the scope of a concept. All objects that make up a class have features in which they are similar to each other and in which they differ from objects that make up other classes that express the scope of other concepts.

A class in the logical sense is all those objects that are expressed in the general concept . If we say "brave man", then the class here will be all brave people.

One class is superior to another if it includes it along with other classes.

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[1] *V. I. Lenin* , Works, Vol. 14, ed. 4, p. 117.

The class “trees” is superior to the class “birches” because the class “trees” includes the class “birches” together with other classes of trees — “firs”, “pines”, etc. A class that is superior to another is called a genus . A class that is inferior to a class that is a genus is *called* a species.

Thus, the class “trees” is a genus in relation to the lower classes — “birches”, “firs”, “pines”. “Man” is a genus, and “European” is a species (in relation to the class “people”).

The same class can be a genus in relation to a lower class and a species in relation to a higher one. Thus, the class “coniferous trees” is a species in relation to the class “trees” and a genus in relation to the class “pines” and “firs”.

A concept expressing a class that is a genus is *a generic concept* . A concept expressing a class that is a species is *a specific concept* . *A genus that is directly divided into species is called the closest genus* (genus proximum) in relation to these species . For example, the class “coniferous trees” is the closest genus for the class “firs”, “pines”, etc. The class “tree” is generally a genus for the classes “firs”, “pines”, etc., but not the closest genus, which it is for the classes “deciduous trees” and “coniferous trees”. The highest class of these objects is called *the highest genus* (summum genus), and the lowest class, which is no longer divided into further classes, is called *the lowest species* (infima species).

Another example. If we consider the class of birds, then the highest genus will be birds (in general), the lowest species, for example, the common siskin, which lives in Europe. Of course, for the class of birds there is also a higher class (subdivision) — “vertebrates”, but this class already goes beyond the objects we are considering. The highest class in the absolute sense, i.e. the class above which there is no class at all that can serve as a genus for it, can only be such objects that are expressed by categories.

A lower species cannot be further divided into species (otherwise it would not be a lower species), but is divided only into individual objects.

An individual object included in a class that is not subject to further division is called *an individual*. An individual means indivisible, i.e. not subject to further division (in Latin, individuus means indivisible). An individual, i.e. an object that is not subject to further division, corresponds to an individual (single) concept. For example, Suvorov, Moscow, this table, Moscow State University, etc., are individuals in a logical sense.

In colloquial speech we usually call people individuals (or individuals), but in a logical sense any separate object that cannot be divided is called an individual. Thus, the desk at which I am now writing, the carafe of water in front of me, etc., are all individuals. Of course, an individual can be physically or mentally divided, broken into parts, but each part will no longer be an object that falls under the given concept. For example, this chair can be divided into a seat, legs, and a back, but each of these parts will no longer be a chair. Moscow State University is divided into faculties, but each faculty is a faculty of the university, but not the university itself. In this sense, it is impossible to divide an individual and retain the same concept for it.

The content of a concept is the totality of all essential features of objects and phenomena covered by the concept. For example, the content of the concept “man” is a living being that creates tools of production and has the ability to think abstractly. The content of the concept “glass” is a cylindrical glass object, hollow, closed at one end, open at the other, used for drinking.

Since a concept expresses not everything, but only the essential features of the corresponding objects and phenomena, it is precisely the totality of essential features, and not all features, that constitutes the content of the concept.

What is the significance of the scope and content of a concept? A concept, as we know, expresses the essential features of objects and phenomena of objective reality. When we consider any concept, we must find out what corresponds to this concept in reality, what objects and phenomena it covers, what objects and phenomena it extends to. This is the scope of the concept. But the objects and phenomena to which the concept extends have various features, including essential ones, which are actually inherent in these objects and phenomena (if, of course, the concept is true). These features constitute the content of the concept, and when considering any concept, they must be clarified. Thus, if a concept is true, its scope and content express certain objects and properties of objective reality.

§ 6. RELATIONSHIP BETWEEN THE VOLUME AND CONTENT OF THE CONCEPT

The volume and content of a concept are inversely related, i.e. as the volume of a concept increases, its content decreases, and as the content of a concept increases, its volume decreases. Indeed, the more objects are compared, i.e. the greater the volume of a concept, the fewer common features these objects will have, i.e. the less content they will have. Let us take a concept such as “person” and the concept “Russian”. The concept “person” has a greater volume, because the concept “person” applies to all people in the world, while the concept “Russian” applies only to some people. This means that the volume of the concept “person” is greater than the volume of the concept “Russian”. But the concept “Russian” will contain all the features that are inherent in all people, and in addition, there will also be special features that are inherent only to Russians. This means that there are more features in the concept “Russian”. Thus, greater volume—less content; greater content—less volume.

Another example: “table” and “writing desk”. The concept of “table” will have a greater scope because this concept applies to all tables, while the concept of “writing desk” applies only to some tables, and the content will be greater in the concept of “writing desk” because all the features inherent in any table are also inherent in a writing desk, and in addition, the latter has some other features that distinguish it from other tables.

Another example: “war” and “just war”. The concept of “war” has more scope, since it covers all wars, not just ones. But the concept of "just war" has more content, since in addition to the features inherent in all wars in general, it has special features: it has the goal of protecting the people from external attack and attempts to enslave them, or liberating the people from the slavery of capitalism, or liberating colonies and dependent countries from the oppression of imperialists.

In order to correctly understand this inverse relationship between the volume and content of a concept, it is necessary to keep in mind the following. The content of a concept is considered only in the formal-logical sense, i.e. as a set of essential features common to all objects covered by the concept. Therefore, the more general a concept is, i.e. the wider the class of objects it covers, the fewer features all these objects have in common, i.e. the lesser its content. But lesser content in the formal-logical sense does not at all mean lesser significance, lesser cognitive value of the concept: a generic concept that has lesser content than the specific concept that comprises it may have not lesser, but greater cognitive significance, may express the nature of a given class of objects more deeply than specific concepts that cover smaller groups of objects and therefore have greater content. Indeed, a more general, broader generic concept includes as possible all the features of the specific and individual concepts included in it. But the content of a concept in the formal-logical sense is not made up of possible attributes, but of actual attributes, necessarily inherent in all objects to which the concept is applicable, and therefore a concept that is broader in scope has less content than a concept that is narrower in scope.

§ 7. RELATIONS BETWEEN CONCEPTS

The following relationships exist between concepts: 1) the relationship of identity, 2) the relationship of subordination, 3) the relationship of subordination, 4) the relationship of partial coincidence and 5) the relationship of disagreement.

1. The relation of identity. In the relation of identity, the volumes of two concepts coincide. For example, the concepts of "USSR" and "the country that built socialism" are identical concepts: the USSR is the country that built socialism, both concepts apply to the same object.

Another example: "Mikhail Sholokhov" and "the author of "Quiet Flows the Don". These are also two identical concepts, i.e. they have the same scope, refer to the same object — the writer Sholokhov, who is the author of "Quiet Flows the Don". The same "Moscow" and "the capital of our homeland" are identical concepts. This means that identical concepts have the same scope, i.e. they refer to the same objects, subjects, things. Is their content the same or different? If the content of these two concepts were the same, then we would have not two concepts, but two words to denote the same concept. Obviously, the content of two identical concepts is different, although the scope is the same. This difference in content with a common volume can arise due to the fact that every concept does not express the objects it covers completely, with all their characteristics, but highlights only certain characteristics, from a certain angle, for certain cognitive purposes.

Therefore, one and the same object or one and the same class of homogeneous objects can be expressed by many concepts, some of which express one feature, and others — other features of the same objects. Thus, the concepts of "USSR" and "the country that built socialism" refer to one object, these are identical concepts, but their content does not completely coincide. The concept of "USSR" indicates the properties of the state itself — the Union of Soviet Socialist Republics, while the concept of "the country that built socialism" indicates the main achievement of the USSR — the built socialist society.

The difference in the content of identical concepts is only logical, i.e. in the thoughts about a given object, and not in the object itself. Identical concepts relate to the same object; in one concept, one set of features is distinguished, and in the other, other features of the same object.

All identical concepts can replace each other. During discussion, reasoning, we can always use another concept, identical to it, instead of one, and this will not cause a logical error.

For example, when setting out the history of our country, in one case we will designate the USSR as a voluntary union of Soviet socialist republics, in another case as a socialist state of workers and peasants, in a third case as a country that built socialism, in a fourth case as our great socialist homeland; all these concepts, as identical, relate to one and the same object, in which, depending on the course of presentation and development of thought, we indicate now one, now another feature.

Graphically, the identity relationship between concepts can be denoted in this way (see Fig. 1).

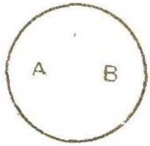

Рис. 1

The circle signifies the volume of the concept; here we have two circles, *A* and *B*, but they coincide, so that circle *A* is at the same time circle *B*.

2. The relationship of subordination or subordination. *The subordination relationship is as follows: volume one concept is part of the scope of another concept, i.e. is included in its scope.* The concept that includes another concept is called *the subordinate* concept, and the concept that is included in the other concept as part of its scope is called *the subordinate* concept. Let us take two such concepts — "student" and "secondary school student". "Student" is a subordinate concept, "secondary school student" is a subordinate concept. The scope of the concept "secondary school student", i.e. those persons who study in secondary school, is part of the scope of the concept "student", i.e. all persons who study somewhere (in universities, technical schools, etc.). Another example: "Soviet republic" and "Soviet union republic". "Soviet republic" is a subordinate concept, "Soviet union republic" is subordinate, since it is included in the scope of the subordinate concept "Soviet republic" together with another type of Soviet republic — "Soviet autonomous republic". This is the relationship between the concepts of the subordinator and the subordinate from the point of view of their volumes: *the volume of the subordinate concept is* *included in the volume of the subordinating concept as part of it.*

The relationship between the subordinate and subordinate concepts is different from the point of view of their content. *The content of the subordinate concept is included in the content of the subordinate concept as part of it.* Thus, the features of the concept “student” (subordinate concept) are also features of the concept “secondary school student”, but the concept “secondary school student” has other features that are inherent only to secondary school students, but are not inherent to other students. The same is in the example with the concepts “Soviet republic” and “Soviet union republic”: all the features of the Soviet republic (subordinate concept) are also present in the Soviet union republic. But the Soviet union republic (subordinate concept) also has its own special features that distinguish it from another type of Soviet republic — an autonomous republic: the right to secede from the USSR, broader competence, etc.

Thus, if the scope of the subordinate concept is included in the scope of the subordinate concept, then the content of the subordinate concept includes the content of the subordinate concept. This position can be expressed as follows: *the scope of the subordinate concept always includes the scope of the subordinate concept, but the content of the subordinate concept is only part of the content of the subordinate concept.*

It follows that everything that can be said about *the subordinate concept can also be said about the subordinate concept, but not everything that can be said about the subordinate concept can also be said about the subordinate concept.*

If a subordinate concept has some characteristic, we will necessarily find this same characteristic in the subordinate concept. But we may not find a characteristic of the subordinate concept in the subordinate concept, since it can only be characteristic of the subordinate concept. For example, the concept of "mammal" (subordinate concept) and "horse" (subordinate concept). Everything that is characteristic of mammals is also characteristic of horses, for example, mammals breathe with lungs and horses breathe with lungs, etc. But not everything that is characteristic of horses will be characteristic of all mammals, for example, horses have hooves, but many mammals do not have hooves.

Graphically, the subordination relationship is expressed as follows (see Fig. 2).

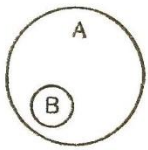

Рис. 2

Circle *A* means a subordinating concept, circle *B* means a subordinate concept. Concept B is included in concept A and constitutes part of its volume.

3. The relationship of subordination, or coordination. *The relationship of subordination is the relationship between concepts that are equally subordinate to a third concept.*

For example, "deciduous trees" and "coniferous trees" are subordinate concepts in relation to each other, since both of them are subordinate in relation to the concept of "tree".

“Just wars” and “unjust wars” are concepts subordinate to each other and subordinate to the concept of “war”.

In a subordination relationship, the volumes of the subordinate concepts are different, since they relate to different objects. In terms of content, the subordinate concepts have some common features, while their other features are different. The common features of the subordinate concepts, i.e. the common part of their content, are the features of the concept subordinating them. The remaining features of the subordinate concepts are different. Thus, coniferous and deciduous trees have common features of trees, but in other features they differ from each other.

The concepts of “just war” and “unjust war” have in common only the characteristics inherent in any war in general, while all their other characteristics (character, goals) are different and mutually exclusive; our attitude to just and unjust wars is also different: we allow and can wage only a just war.

The graphical representation of subordinate concepts is as follows (see Fig. 3)

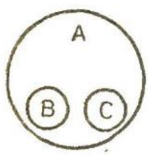

Рис. 3

4. Partial coincidence relation. *In a partial coincidence relationship, two concepts have some common features and part of their volume is common.* Example: “students in higher education institutions” and “athletes”. It is clear that these are different concepts. There is a partial coincidence relationship between these two concepts because some students in higher education institutions are also athletes. Consequently, such concepts have part of the common volume and part of the common content, but otherwise their volumes and content are different.

Another example: “pilots” and “officers” are concepts that partially coincide, since many pilots are officers, and many officers are pilots.

Graphically, the partial coincidence relationship is depicted as follows (see Fig. 4).

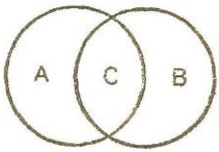

Рис. 4

Such concepts are also called *intersecting* .

Thus, partially coinciding (intersecting) concepts have part of the common volume (in the figure — *C*) and part of the common content, since some features related to those objects that make up part of the common volume of both concepts (*C*) are also common to both concepts (*A* and *B*).

5. The relation of disagreement. The relation of disagreement exists between concepts whose volumes are different and in which the features included in the content of one concept negate the features included in the content of another concept. For example, between the concepts of “good” and “evil” there is a relation of disagreement, because the features of the concept of “evil” negate the features of the concept of “good”.

The same applies to “courage” and “cowardice”, “guilt” and “innocence”.

In Pushkin’s work “Mozart and Salieri” there is such an expression: “Genius and villainy are two incompatible things.” This means that the concepts of genius and villainy are incompatible, there is a relationship of disagreement between these concepts, i.e. one concept excludes the other, both concepts cannot be applied to the same objects.

Graphically, the disagreement relationship can be represented as follows (see Fig. 5).

Рис. 5

There is no coincidence or intersection between circles *A* and *B*.

In the relationship of disagreement there are *contradictory concepts and opposite concepts.*

Contradictory concepts are concepts that have certain specific attributes in their content, while another concept denies these attributes, and this denial constitutes the entire content of this second concept. Such concepts as “evil” and “not evil” are contradictory concepts, since the content of the concept “not evil” is the denial of the attribute of malice contained in the concept “evil”. “Fairness” and “injustice” are contradictory concepts, since the content of the concept “injustice” is the denial of the attributes of justice. The same is represented by the concepts “guilt” and “innocence”: the concept “innocence” denies the attribute of guilt. “Solid Body” and “non-solid body” are contradictory concepts, since the concept “solid body” affirms the attribute of a body — hardness, and the concept “non-solid body” denies this attribute in a body.

Opposite concepts are those in which the negation of the features of one concept is only part of the content of another concept, but this second concept also has its own special features that characterize the objects it covers. For example, “good” and “evil”, “brave” and “coward”. The content of the concept “evil” negates the feature contained in the concept “good”, but, in addition, has its own features (anger, malice).

Contradictory concepts can be designated as follows: *A* and not- *A* (the second concept negates the first).

Opposite concepts can be designated as *A* and not- *A* + *b* (the second concept negates the first and, in addition, has its own characteristics— *b*).

“White” and “non-white” are contradictory concepts because the concept “non-white” simply denies the attributes of the concept “white” and there are no transitional stages between the concepts “white” and “non-white”. An object is either white or not white. We have already discussed this issue when we talked about the law of the excluded middle. The concepts “white” and “black” are contradictory concepts because the concept “black” not only denies the content of the concept “white”, but also has its own attributes.

Between opposite concepts there are intermediate concepts, for example between the concepts of “white” and “black” there are a number of transitional stages (for example, “grey”). Therefore, the law of the excluded middle does not apply to the relations between opposite concepts, but the law of contradiction does, since both opposite concepts cannot be applied to the same object at the same time.

The relationship between contradictory and opposite concepts can be graphically represented as follows:

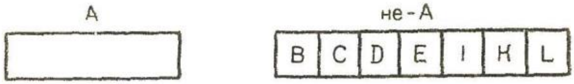

Рис. 6

A and not- *A* are contradictory concepts, the scope of the concept *not-A* lies outside the scope of the concept *A* , the features of the concept e-A consist in the negation of the features of the concept *A*. But the concept *not-A* includes various concepts, united by the fact that all of them are not the concept *A*. These concepts, included in the concept *not-A*, in their content, i.e., in the features of the objects they cover, can differ from the concept *A* to varying degrees: they are all *not-A* , i.e., something different from *A* , but this difference can be expressed to varying degrees, for example, if *A* is white, then *not-A* is not white, which includes all shades of colours except white; if they are arranged in order of gradual darkening, then the extreme, most distant place from *A* is occupied by black, designated *L in our diagram*. White colour (*A*) and black colour (*L*) will be opposite concepts, between which there is a series of intermediate concepts expressing different colours, increasingly darker as they move away from *A*, i.e. from white.

Two contradictory concepts, as well as two opposite concepts, although one of them excludes the other, incompatible with it, always have something in common between them, which makes it possible *to compare them*. If there is nothing in common between two concepts, then they cannot be compared at all, there is no relationship between them. This common thing for two concepts can be that these two concepts are subordinate concepts; and, consequently, they both fall within the scope of some other, more general concept. For example, the concepts "good" and "evil" are comparable because they have something in common: both are a certain spiritual quality. "White" and "non-white" are comparable concepts because they fall within the general concept—colour. "White" and "non-white" are different colours; but with all their differences, they have something in common—the attribute of colour. If concepts have nothing in common with each other, there is no logical relationship between them and, consequently, they are incomparable. For example, "ice" and "courage", "table" and "earth movement", "mind" and "rose". These concepts cannot be compared because they are completely different, there is nothing in common between them.

Contradictory and opposite, i.e., inconsistent, concepts are subordinate, included in the scope of a higher concept, while contradictory concepts make up the entire volume of the subordinating concept, and the opposite ones make up part of it. B and *C* are two inconsistent concepts: opposite, or contradictory, they are included in the volume of the concept *A* that subordinates them . If these two concepts *B* and *C* are contradictory concepts, then together they make up the entire volume of the concept *A* (see Fig. 7)

This can be denoted as follows: B + C = D. If these concepts are opposite, then their volumes together are less than *A*:

$$B + C < A.$$

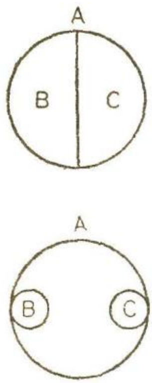

Рис. 7

For example, “tall people” and “short people (in height)” are opposite concepts, and the volumes of both concepts do not make up the entire volume of the subordinate concept “people” since, in addition to tall and short people, there are many people of average height. The concepts “tall people” and “not-tall people” are contradictory concepts, and the volumes of these concepts make up the entire volume of the concept “people”, since all people can be divided into tall and not-tall without a remainder (those people who are not tall, no matter what their height, will be classified as not-tall).

It should be borne in mind that the rule according to which the sum of the volumes of opposite concepts is less than the volume of the more general concept of which they both are included, is applicable to those cases when we are considering truly opposite concepts, i.e. those that occupy extreme positions in a series of many concepts changing in content (from white to black, from courage to cowardice, etc.). But if we simply divide the volume of any concept into groups of objects based on any concept into groups of objects based on any specific feature, the volumes of the concepts expressing these new groups of objects will, in their sum, make up the volume of the original divided concept and will not be opposite at all. For example, the volume of the concept “people” based on gender can be divided without a remainder into “men” and “women”: the volume of the concept “men” and the volume of the concept “women” will make up the entire volume of the concept “people”. This will be entirely correct, since the concepts “men” and “women” are not at all opposite concepts, they are simply subordinate concepts. In other words, all opposite concepts are subordinate, but not all subordinate concepts are opposite, but only those that express the most distant, most sharply different in content concepts in a series of many homogeneous concepts.

§ 8. NAME OF CONCEPTS

Every concept is expressed in a word, and often in several words. “Man” is a concept expressed in one word; “a great man” is a concept expressed in two words; “a man who passionately loves his homeland” is a concept expressed in five words.

The same word can express different concepts. For example, the word “key”. A key is a tool for opening a lock, and a key at the same time means a spring, a source. The word is the same, but it expresses different concepts. Speculation is a criminal offense. But speculation also means speculative idealistic philosophy, i.e. a philosophy that develops its positions not on the basis of experience, the study of nature, but on the basis of various abstract positions divorced from reality. Therefore, the word “speculative” also has different meanings. We are talking about a speculative transaction, i.e. a crime punishable under Article 107 of the Criminal Code of the RSFSR, and we are talking about speculative philosophy, having in mind some old philosophical schools that based their systems on abstract speculation, divorced from practice and reality. The word “world” also denotes different concepts. When they say “peace throughout the world”, the first word “peace” means agreement, calm, absence of war, and the second word “peace” means all of humanity, the whole world. In foreign languages, these concepts are designated by different words. For example, in French, peace as agreement is la paix, peace as light, humanity is le monde. In Russian, according to the old spelling, the world in the second meaning was written as міp, now the distinction between these concepts can only be made by meaning. It would be possible to give many examples of this kind of words that mean completely different concepts, and this must always be kept in mind when using words, because if we use the same word, putting a completely different meaning into it, then we will never reach the correct disclosure of the scope and content of the concept denoted by this word, and we will violate the law of identity.

The verbal expression of a concept is called *a name*. *Singular concepts are designated by a singular name, general concepts by a general name*.

A name is a verbal designation of a concept. “Commander” is a general concept; it is designated by a general name. “Commander Suvorov” is a singular concept; it is designated by a singular name. A collective concept is designated *by a collective name* (for example, “library”, “forest”).

We cannot designate or express concepts in any other way than with words. True, sometimes we use gestures to express concepts, for example, by showing the size of an object with our hands. But even in these cases, the corresponding word (big, small, etc.) is implied and mentally pronounced. Therefore, a name (in the sense of a title) is the same concept expressed by a word. Whatever concept I name, it will be a concept in a logical sense (as a form of thinking) and a name in a grammatical sense (a word—noun, adjective, etc.). Since in studying logic we deal with forms of thinking, and not with grammatical forms, we speak of concepts, and not of names, but we can always speak of names, since each name implies the concept it designates.

§ 9. ON THE MATERIALISTIC NATURE OF GENERAL CONCEPTS

As was indicated above (§ 4), concepts are divided into general and singular (individual). A general concept, expressed by a common name, covers an indefinite number of corresponding objects and phenomena. A singular concept refers to a specific object. Our concepts are a reflection in consciousness, in thinking, of various phenomena and aspects of the real world, and this is their cognitive significance. The nature of singular concepts is quite clear—in reality, they correspond to individual objects and phenomena. But in logic, the primary significance belongs to general concepts.

A general concept does not correspond to any specific individual object, individual thing, individual phenomenon, as opposed to a single concept. For example, the general concept is “table”. What specific individual object actually corresponds to this general concept? There are individual tables, but no table at all. The concept of “man” does not correspond to any specific individual, whereas in reality we only encounter individual people. In this regard, the question arises about the nature of these general concepts. What do they express, what corresponds to them in reality? After all, a concept is only true when it expresses some object, some aspect of reality.

It is interesting to learn how the question of the nature of general concepts was resolved in the history of philosophy. On this issue, two currents emerged in medieval scholastic philosophy: *realism and nominalism*. The realists, i.e., the representatives of the current that was called realism, expressed their views on general concepts in the following short formula: universalia sunt gealia, i.e. general concepts are real, they exist in reality alongside individual objects. General concepts represent realities in themselves and exist independently, apart from individual things. This means that there is this table, there is another table, there is a third table and there is a table in general. The concept of “table” exists alongside individual tables, i.e. it has its own independent being. The same, the realists taught, can be said about people: there are individual people, Plato, Aristotle and others existed, but, in addition, the idea of man, the concept of man has real being, and this concept of man exists alongside individual people.

According to the teachings of realists, true reality belongs precisely to general concepts and ideas, which supposedly exist not only independently of objects and things, but also before them: individual objects and things are only reflections, copies of ideas and concepts.

From the above it is not difficult to conclude that in medieval philosophy the term “realism” itself meant something completely different from what it means to us now.

Realism is a system of views that proceeds from and is based on reality. In this sense, we speak, for example, of socialist realism in fiction. In philosophical terms, the word “realism” can mean the same thing as materialism, and Lenin pointed out on this issue: “Following Engels, I use in this sense only the word:

materialism, and I consider this terminology to be the only correct one, especially in view of the fact that the word “realism” has been seized upon by positivists and other muddle-heads who waver between materialism and idealism”[2] .

In medieval philosophy, realism had a completely different meaning: it denoted not the reality (actuality) of the objective world, nature, but the reality of general concepts as special entities and the absence of reality of the material world.

Realism in medieval philosophy was an extreme manifestation of idealism, because from the point of view of medieval realism, it is abstract and general concepts that have real existence.

Although the supporters of the theory of the reality of general concepts called themselves realists, the meaning of their theory was extremely idealistic, because reality itself was deprived of reality by realists, and reality was attributed to general concepts, ideas. Thus, medieval realism fundamentally incorrectly resolved the question of the nature of general concepts.

The second trend is nominalism. Its view on general concepts is briefly expressed in the formula: universalia sunt nomina, i.e. general concepts, are only names, titles. According to the views of the nominalists, in reality there exist only individual things with their individual qualities, individual objects, phenomena, objects. No general concepts exist in reality. A general concept is only a name, only a designation. According to the views of the nominalists, individual real objects exist, and only they. No general concept, for example,

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[2] *V. I. Lenin*, Works, Vol. 14, ed. 4, p. 48.

[1] In the sense of the opposite of idealism. — M.S.

“man”, exists, and in reality nothing really corresponds to the concept “man”. “Man” is only a name, only a designation, which our thought creates to name an infinite, indefinite number of individual people. How should this trend be characterized? From our point of view, nominalists could call themselves realists with more right than those who called themselves realists, because nominalists recognized the real existence of the real world. It is not difficult to detect a strong materialistic stream in the teachings of the nominalists, and this is a positive feature of their views, although they are basically scholastic. But on the whole the view of the nominalists, although it contained a certain grain of truth, must be recognized as incorrect. To the question of whether general concepts exist or not, the nominalists answered in the negative: general concepts do not exist, nothing in reality corresponds to them; they are only a name, they are only a designation, a creation of our thought. But this is completely incorrect.

If the nominalists’ assertion that separate things, separate objects, really exist is correct, then their assertion that general concepts are only names and designations to which nothing in reality corresponds is incorrect. It is not true that general concepts—”man,” “table,” “living creature,” “plant,” etc.—correspond to nothing in the real world. A concept is only true when it reflects some aspect of objective reality.

The incorrect, vicious interpretation of the nature of general concepts takes place in the new bourgeois philosophy no less than in medieval scholastic philosophy.

Bourgeois idealistic philosophy considers general concepts as forms of consciousness rooted in the properties of consciousness itself, and not in objective reality. Kant treated the most general abstract concepts as a priori forms of consciousness, i.e. forms that are present in consciousness a priori , before experience and independently of experience, and are introduced by consciousness into perceived phenomena in a ready-made form. Sometimes general concepts are interpreted in the spirit of psychologism, as subjective states of consciousness, connections of ideas; sometimes they are given the character of conventional signs, symbols.

All these idealistic interpretations are completely untenable, vicious, and tear thinking away from the real world.

Marxism considers general concepts as a reflection in consciousness of the properties and aspects of objective reality.

General concepts reflect the qualities, characteristics of existing things and phenomena, namely the essential characteristics of objects, phenomena and things, and when we speak not about any particular person, but about man in general, then in this concept we combine the essential characteristics of all people, those characteristics that are inherent in all people, without which people do not exist in reality and which distinguish people from other living beings.

Thus, *general concepts have a materialistic nature*; they reflect the general and essential properties of objects, things, phenomena that exist in reality. *General concepts reflect the actual community of existing things, phenomena.* V. I. Lenin pointed out: “It is impossible to deny the objectivity of concepts, the objectivity of the general in the individual and in the particular” [1]. And further: “... the individual does not exist otherwise than in the connection that leads to the general. The general exists only in the individual, through the individual. Every individual is (in one way or another) general. Every general is (a part or side or essence) of the individual. Every general only approximately embraces all individual objects. Every individual is incompletely included in the general, etc., etc."[2]

This is the materialistic solution to the question of the nature of general concepts. General concepts, if they are true, express the actual general properties of actually existing individual objects. Individual objects actually have something in common with each other, and this commonality is expressed in general concepts.

The objective reality reflected by general concepts moves, develops, and this movement finds its expression in general concepts. Lenin wrote: "...human concepts are not motionless, but are constantly moving, passing into each other, pouring one into another, without this they do not reflect living life. The analysis of concepts, their study, "the art of operating with them" (Engels) always requires the study *of the movement* of concepts, their connections, their mutual transitions..."[1] But this dialectical movement of concepts already goes beyond the limits of formal logic and belongs to the sphere of dialectical logic, materialistic dialectics.

* * *

[2] Ibid., p. 329.
[1] *V. I. Lenin* , Philosophical Notebooks, p. 153.
[1] V. I. Lenin, Philosophical Notebooks, p. 237.

Thus, a concept is a form of thinking that reflects objective reality in human consciousness. A concept has a scope and content: a concept relates to a more or less wide range of objects and phenomena (scope), expressing their essential features (content). In order to understand the objects and phenomena covered by a concept, it is necessary to reveal the content of the concept, i.e. to establish those features of objects and phenomena that are reflected in the concept, and to reveal its scope, i.e. to understand those objects that are covered by the concept. Revealing the content of a concept is called *defining the concept* , revealing the scope of a concept *is called dividing the concept*.

Let us move on to considering the definition of the concept, i.e. the disclosure of its content.

Chapter V. DEFINITION OF CONCEPTS

1. The essence of definition. 2. Definition through the closest genus and specific difference. 3. Genetic definition. 4. Logical forms similar to definition. 5. Rules of definition. 6. Typical errors in definitions. 7. The meaning of definitions.

§ 1. ESSENCE OF THE DEFINITION

Each concept reflects the essential features of homogeneous objects, phenomena, things. These features form the content of the concept. *Definition, or definition (definitio), is the disclosure of the content of the concept, i.e., an indication of the essential features of objects, phenomena, reflected by the concept.*

Thus, to define a concept means to indicate the essential features of those objects and phenomena that are covered by a given concept, and these features must be indicated in their mutual connection. For example, to define the concept of a "glass" means to indicate the essential features of a glass that distinguish it from any other vessel: an object used for drinking, cylindrical in shape, hollow, closed on one side (the bottom), and open on the other. To define the concept of a "person" means to indicate the essential features of a person that distinguish him from other creatures: a living being capable of creating tools and means of production, possessing a developed consciousness and thinking.

To define the concept of “state” means to indicate the essential features of the state that distinguish it from other social phenomena: the political organization of the ruling class, which consolidates and protects the dominance of this class and suppresses the resistance of hostile classes. Consequently, the definition of a concept is the definition of those objects that are covered by this concept. To define the concept of “man” means to define what man is. To define the concept of “state” means to define what the state is, etc.

§ 2. DEFINITION THROUGH THE NEAREST GENUS AND SPECIFIC DIFFERENCE

The simplest and most natural way of definition may seem to be a simple listing of the characteristics of the object being defined. The concept of “table” can be defined by listing all the characteristics of a table that are inherent to all tables and by which a table differs from other pieces of furniture — a chair, a sofa, etc. The concept of “person” can be defined by listing the characteristics of a person, i.e. the characteristics that are inherent to people and distinguish them from other living beings. This method of definition seems to be the most natural. But in reality, it is impossible to make a definition in this way, because each phenomenon, each object has an infinite number of characteristics.

The concept, however, does not cover everything, but only the essential features of an object. But even defining a concept by simply listing all the essential features would be an extremely difficult and often impossible task. First of all, in order to isolate the essential features of a given object from the sum of all its features, it would be necessary in each individual case of definition to go through all the features of the objects being defined, so to speak, to sort them. And then each object has many features, some of which are essential in one respect, others in another, others in a third, etc. For example, any object is characterized from the physical side by some features, from the chemical side by others, and from the point of view of its practical use to satisfy our needs by others, etc. Logic establishes a method of definition that eliminates all these difficulties and at the same time makes it possible to indicate the essential features of the objects being defined. This is achieved in the following way. The concept being defined is brought under another, more general concept, to which the given concept is subordinated and part of whose volume it constitutes, and then the feature is indicated by which the concept being defined differs from other concepts, also subordinated to this general concept, also included in its volume.

This method of definition is called *definition through the closest genus and specific difference* (definitio per proximum genus differentiam specificam). This means the following. If we want to define any object, we must first find the closest genus (genus proximum), i.e. the immediately broader class of objects, which includes the objects in question as a species. And then we find the specific difference (differentia specifica), i.e. the feature that distinguishes the objects under consideration from other species of the same class (genus).

For example, we need to define the concept of "barometer". We define it as follows: "a physical device used to measure atmospheric pressure". "Physical device" is the closest genus, the immediately highest class, which includes barometers, "used to measure atmospheric pressure" is a specific difference, a feature that distinguishes a barometer from other objects of the same class, i.e. from other physical devices (for example, from a thermometer). We want to define what a "parallelogram" is. We define it as follows: "a quadrilateral with opposite sides parallel". "Quadrilateral" is the closest genus, "parallelism of opposite sides" is a specific difference. A parallelogram is a type of quadrilateral, which is its closest genus, and a parallelogram differs from other quadrilaterals (for example, from a trapezoid) in that its opposite sides are parallel.

Let's give another example. "A student is a person who studies at a higher education institution." In this example, the concept "student" will be the closest genus, since students are a type of learner, and "being at a higher education institution" is a specific difference by which a student differs from other learners (for example, high school students).

Thus, when defining through the closest genus and specific difference, all the characteristics of the defined object are not listed, but only two characteristics are indicated — generic (closest genus) and specific

The concept that is being defined is called the concept being defined, and the concept by means of which the first concept is defined is called *the defining concept* . Thus, if we define the concept of "student" as "a student at a higher educational institution", then “student” is the concept being defined, and “a student at a higher educational institution” is the defining concept. The defining concept, as was said above, contains an indication of the closest genus and specific difference of the concept being defined. The following formula for the definition can be given:

And there is *Sun*.

A is the concept being defined, *Bc* is the defining concept, in which *B* is the closest genus, *and c is* the specific difference.

In order to be able to apply a definition through the closest genus and specific difference to various concepts, it is necessary that the branch of scientific knowledge to which the given concept belongs be sufficiently developed so that the objects it studies are classified. Otherwise, it is difficult to find the closest genus for the concept being defined, and if it is found, it may be unclear and may itself require a definition.

The application of definitions through the closest genus and specific difference in mathematics is very clear and illustrative (see example above). In social and natural sciences, many definitions are directly expressed through the closest genus and specific difference. For example, “production relations are social relations of people in the process of producing material goods.” The closest genus for production relations is social relations, and the specific difference, i.e. the feature that distinguishes production relations from other social relations, is that they are formed in the process of producing material goods.

Another example from the field of biology is the definition of the concept of heredity given by

Academician T.D. Lysenko: “Heredity *is the effect of concentration of the influence of environmental conditions assimilated by organisms in a number of previous generations”* [1] .

In this definition, the closest genus for the concept of heredity is “the effect of concentrating the effects of environmental conditions,” and the species difference is “the assimilation of these effects by organisms in a number of previous generations.”

Definition through the closest genus and specific difference is easiest when the specific difference is exhausted by some one feature. But this is not always the case: when defining complex concepts, the specific difference may include several features, since one separate feature may not be enough to distinguish a given object from other objects of the same genus and reveal its content. In these cases, when defining an object or phenomenon, one should indicate the genus, and then the specific difference, consisting of several features that distinguish the given species from other species of the same genus. In logical terms, this set of features, i.e., the specific difference, can be considered as one feature, but the latter is complex, consisting of several features, and we cannot omit any of them without compromising the completeness and concreteness of the definition.

A classic example of such a complex definition is the definition of a nation given by Comrade Stalin:

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[1] “On the situation in biological science. Verbatim report of the session of the All-Union Academy of Agricultural Sciences named after V. I. Lenin, July 31–August 7, 1948”, 1948, p. 33.

"A nation *is a historically formed stable community of people that arose on the basis of a common language, territory, economic life and mental makeup, manifested in a common culture"*[2] .

In this definition, the closest genus for a nation is a "historically formed stable community of people", of which the nation is a type; the specific difference that delimits the concept of a nation from other stable communities of people (for example, from state communities) is a set of features: "a community of language, territory, economic life and mental makeup, manifested in a community of culture". Having given such a definition of a nation, Comrade Stalin writes: "It must be emphasized that not one of the above features, taken separately, is sufficient to define a nation. Moreover: the absence of even one of these features is enough for a nation to cease to be a nation... *Only the presence of all the features taken together gives us a nation"*[1] .

Not all concepts can be defined through the nearest genus and specific difference. It is impossible to define the highest genus (summum) through the nearest genus and specific difference. genus), since a higher genus cannot be found for it. Therefore, the categories matter, being, form, content, etc. cannot be defined through the closest genus and specific difference. Speaking about the relationship between matter and consciousness—matter is primary, consciousness is secondary—Lenin wrote that "in essence, it is impossible to give any other definition of the last two concepts of epistemology[2] than to indicate which of

[2] *J. V. Stalin* , Works, Vol. 2, p. 296.
[1] J. V. Stalin, Works, Vol. 2, p. 297

them is taken as primary. What does it mean to give a "definition"? This means, first of all, to bring a given concept under another, broader one. For example, when I define: a donkey is an animal, I bring the concept "donkey" under a broader concept. The question now is, are there broader concepts with which the theory of knowledge could operate than the concepts: being and thinking, matter and sensation, physical and mental? No. These are extremely broad, the broadest concepts, beyond which, in essence (if we do not keep in mind the always possible changes *in nomenclature*)[3] epistemology has not yet gone"[4] .

It is equally impossible to give a definition through the closest genus and specific difference to individuals, separate persons, single objects, since it is impossible to indicate a specific difference in relation to them. An individual can be described, but it is impossible to give a specific difference, therefore it is impossible to give it a definition.

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[4] *V. I. Lenin* , Works, Vol. 14, ed. 4, p. 133.

[3] *Nomenclature* is a collection of accepted names for various objects.—M.S.

[2] Gnoseology is a theory of knowledge, a philosophical doctrine about the human ability to cognize reality. - M.S.

§ 3. GENETIC DETERMINATION

The general form of definition is definition through the closest genus and specific difference. Usually the definition is like this, but sometimes the science of logic and individual scientific disciplines use a different method of definition. There is also the so-called genetic definition. *Genetic definition is a special kind of definition that shows how a given object, a given phenomenon arises*. Sometimes it is permissible to define not by indicating the closest genus and specific difference, but by indicating the way in which a given phenomenon, a given object is created. This kind of genetic definition is sometimes used in mathematics. In geometry, a circle is defined as follows: a circle is a curve formed by the movement on a plane of a point that maintains an equal distance from the centre (i.e. a circle is formed by a point that moves all the time at an equal distance from the centre). This definition is made by indicating the way in which a given object, a given phenomenon, i.e. a circle, arises. This is a genetic definition.

§ 4. LOGICAL FORMS SIMILAR TO DEFINITION

From the definition in the direct sense, i.e. through the closest genus and specific difference, one should distinguish other logical forms that are similar to the definition and sometimes replace the definition or supplement it. These forms are the following.

1. Description of an object. Description of an object is an indication of a number of its features, not only essential ones, but also others. Description of objects is usually applied to individual objects, items, phenomena, since it is impossible to designate a specific difference for them, and therefore it is impossible to give a definition by indicating the closest genus and specific difference. In relation to individual objects, instead of a definition, one has to resort to a description. For example, "this man is tall, has blue eyes, light-brown hair, is 40 years old, etc." This is a description. Description is not a definition, but it can replace a definition when the latter is impossible, and can also supplement a definition, making it more specific.

2. Characteristics of an object. This method consists of indicating individual properties of an object that are most important in some respect: the closest genus and specific difference are not indicated, but only some properties of a given object that have the most important meaning in some respect are indicated.

These are the various characteristics that we give to all sorts of objects, for example:

> ...science is cutting down
> We experience the fast-paced life.
> (A.S. Pushkin, Boris Godunov.)

"The defence of the fatherland is the sacred duty of every citizen of the USSR" (Constitution of the USSR, Article 133).

3. Explanation of the word. For example, the word "logic" comes from the Greek word "lego" — I think, I speak, and "logos" — thinking, reason. This is not a definition of logic 3 an explanation of the word "logic" itself. Next, what is "legal"? We explain that this word comes from the Latin word jus , juris , which means right. This is not a definition of the concept, but only an explanation of the word.

In some logic textbooks, such an explanation of a word is called a verbal definition. But this is not a definition of the object, since it does not indicate its features, but only an explanation of the word itself.

4. A visual explanation of a subject using examples and comparisons. Such expressions are: “children are the flowers of life”, “nature is a great teacher of man”. In fiction, such visual explanations are very common. A visual explanation of a subject using examples and comparisons is of great importance both in practice and in science. It does not define the subject, but can serve as an addition to the definition to make it more expressive and easier to understand.

These are the four logical forms which are not a definition, but are close to a definition and sometimes complement it.

§ 5. RULES OF DETERMINATION

There are five rules that must be followed to ensure that definitions are logically correct. These rules are as follows.

1. The definition must be proportionate (corresponding, adequate). This means that the concept being defined and the concept by means of which the first concept is defined must be the same in scope. The concept being defined and the defining concept must have the same scope, and they can be interchanged: the concept being defined can be put in place of the defining concept, and the defining concept can be put in place of the defined concept. If the definition *A* is *Bc is true* , then it must also be true that *Bc* is *A*. *A* and *Bc* can be swapped. In order to check whether a definition is proportionate, it is necessary to swap the defined concept and the defining concept. If such a change is possible, then the definition is proportionate, if not, the definition is disproportionate. For example, I give the following definition: “a cow is a mammal.” Let’s swap both concepts, then we get: “a mammal is a cow.” But this is incorrect, not all mammals are cows, there are many other mammals. This means that the definition we have given is disproportionate and, therefore, incorrect.

Another example: “logic is the science of the laws of correct thinking.” Let’s check whether this definition is proportionate. Let’s rearrange it: “the science of the laws of correct thinking is logic.” This is correct, which means the definition is proportionate. If I define logic this way: “logic is the science of thinking,” then at first glance this definition is also correct, because logic really studies thinking. Let’s rearrange it: “the science of thinking is logic.” This is clearly incorrect, because psychology is also a science of thinking, in addition to logic. Thus, the definition of logic as a science of thinking was also disproportionate, and therefore incorrect.

Proportionality of a definition is at the same time its precision. A precise definition is one that clearly delimits and distinguishes the defined object from other similar objects. If a definition is disproportional, there is no way to exhaustively distinguish a given object from other objects of the same kind.

The proportionality of a definition is one of the conditions for its correctness, but, of course, the mere fact that a definition is proportionate does not mean that the definition is essentially correct . Every correct definition is proportionate, but not every proportionate definition is thereby essentially correct. The correctness of a definition essentially depends on the fact that this definition expresses the properties of an object that are truly inherent to it, i.e., correctly, in accordance with objective reality, reflects the essence of the defined object. This rule on the proportionality of a definition concerns only the logical correctness of a definition, i.e., the correctness of its construction. This reservation also applies to other rules of definition, which are discussed below.

2. The generic feature must indicate the nearest higher concept, without skipping over it. This means that when we define any concept, we must always find the nearest genus and cannot replace the nearest genus with a more distant genus, even if it subordinates the given concept. This rule follows from the very nature of the definition, which, as we know, is a definition through the nearest genus and specific difference. Since the definition is made through the nearest genus, the generic feature must indicate precisely the nearest generic concept, without skipping over it. This was discussed in detail when we characterised the very essence of the definition.

Example: “a rhombus is a parallelogram with equal sides.” Here “parallelogram” is indeed the closest genus, the immediately highest concept, so the definition is correct. If we defined a rhombus not through a parallelogram, i.e. not through the closest genus, but through a more general concept, for example, through a quadrilateral, we would have either an incorrect or overly complicated definition.

3. A specific distinction must be a feature that is characteristic only of the defined concept and is absent in other concepts related to the same genus. This means that the defined concept must have as its specific distinction a feature that is not present in other subordinate concepts, i.e., in other concepts related to the same genus.

This is clearly evident from the examples given above.

4. The definition must not be negative. A negative definition would indicate what the given object is not, and not what it is. For example, the following negative definitions do not provide anything: “a glass is not a saucer”, “a horse is not a cow”, “a rhombus is not a square”, etc. Negative definitions of this kind are unacceptable: they say what these objects are not, but we need to know what they are. Sometimes, however, there are cases when it is necessary to resort to negative definitions. We are talking about the definition of so-called negative concepts. For example, what is darkness? We say that darkness is the absence of light. Such a negative definition is acceptable, because darkness itself in this case is a negative concept. What is stupidity? Stupidity is the absence of intelligence. This is also correct, because stupidity is a negative concept and means the absence of a positive quality in a person — intelligence.

Thus, negative definitions can be used only in cases of defining purely negative concepts.

5. Every definition must be complete and clear.

A complete definition is one that specifies all the essential features of an object. Therefore, an incomplete definition is one that, although it correctly specifies the features of an object, does not specify all of its essential features. For example, “man is a rational being.” This definition is correct in the sense that it specifies one feature of man—reason, but this definition is incomplete because it does not specify the other most essential features of man (the ability to create tools of production).

A clear definition is a definition in which only well-known features are indicated. Consequently, a definition in which features of the defined object are indicated that are themselves unknown and themselves require definition will be unclear.

§ 6. TYPICAL ERRORS IN DEFINITIONS

Let’s consider typical errors in definitions that sometimes occur in practice. We will indicate the most common ones.

The first error is that the definition is either too narrow or too broad. The meaning of this error becomes quite clear if we recall what was said about the proportionality of the definition.

The disproportion of a definition can be expressed in two forms: in an excessively broad definition or in its excessively narrow definition. For example, the definition of logic as a science of thinking will be excessively broad, since not only logic is a science of thinking, but also psychology. The definition of logic as a science of inferences is too narrow, since logic deals not only with inferences, but also with other forms of thinking (concept, judgment).

From the examples given, it is clear that a definition that is too broad is one in which the scope of the defining concept is greater than the scope of the concept being defined. A definition that is too narrow is one in which the scope of the defining concept is less than the scope of the concept being defined. And, as we know, the scopes of both of these concepts must be the same.

The second error is a tautology in the definition. In Latin, this is expressed by the formula idem per idem ("the same through the same"), i.e. the defined object is defined through itself, although sometimes in other expressions. For example, "conscientiousness consists in the fact that a person conscientiously fulfils his duties", "a formalist is a person who formally approaches the task entrusted to him". This is all tautology.

The third mistake is a circle in definition. A circle in definition consists in the fact that in one definition one concept is defined through the second, and this latter concept in another definition is defined through the first. It is not difficult to see that a circle in definition is essentially the same as a tautology, and is distinguished only by its greater complexity. For example, "logic is the science of the laws of correct thinking." This is true, but what are the laws of correct thinking? These are the laws formulated by logic. We correctly defined logic through the laws of correct thinking. But when we needed to define the laws of correct thinking themselves, we defined them through the concept of "logic", i.e., we returned to where we started, and this is already incorrect, it is a logical mistake. "What is rotation?" "Rotation is movement around an axis." "What is an axis?" "An axis is a straight line around which rotation occurs." This is also a circle in definition.

The fourth error is defining the unknown through the unknown. This error consists in the fact that sometimes a concept is defined through another concept, the attributes of which are unknown and which itself is subject to definition. In Latin, this error is called ignotum per ignotius, i.e. the unknown through the even more unknown. Sometimes this erroneous method of definition is called "defining x through y", since in mathematics x and y denote unknown quantities that still need to be determined.

§ 7. MEANING OF DEFINITIONS

Definition reveals essential features of the studied objects, phenomena. When studying any object, we need to define it, we need to give it a definition. In any field of science (natural, social), the studied objects are given definitions. Thus, definition is an essential element of the process of cognition of reality.

The presentation of any science in a textbook or course must necessarily contain a precise definition of the subject of this science. At the philosophical discussion on the book by G. F. Aleksandrov "History of Western European Philosophy" on June 16-25, 1947, Comrade Zhdanov indicated the following as the first, elementary condition, the observance of which must be required from a textbook on the history of philosophy: "The subject of the history of philosophy as a science must be precisely defined in the textbook[1]." This

[1] *A. A. Zhdanov*, Speech at the discussion on the book by G. F. Alexandrov "History of Western European Philosophy", Gospolitizdat, 1947, p. 5.

provision has a general meaning and applies to a textbook on each branch of scientific knowledge: in a logic textbook, the subject of logic must be defined, in a biology textbook, the subject of biology, etc. Each science, in addition to the definition of its own subject, also includes definitions of many more specific subjects that it studies. Each subject, each concept in scientific research must be precisely defined, otherwise ambiguities, confusion of concepts, etc. will inevitably arise in science. But when using definitions, the following must be borne in mind. There is a Latin expression: omnis definition periculosa est , i.e. “every definition is dangerous”. This is true: every definition cannot encompass the entire subject as a whole, cannot encompass the entire phenomenon in all the diversity of its features. The word “definition” itself gives a fairly clear idea of this dangerous side of every definition. “Definition” comes from the word “limit”, “border” (definition — from finis — limit, border). This means that every definition limits a given subject, separating it from many other related subjects and phenomena. A definition cannot encompass an object completely, it does not exhaust our knowledge of subjects and phenomena, but serves only as a guide on the path to full and accurate knowledge of reality, giving a brief formula summing up the knowledge already achieved about a given subject. As a result of an increasingly deeper knowledge of the nature of things, phenomena, a definition can change. Therefore, a definition cannot be given once and for all, final, frozen. A definition, insofar as it does not and cannot encompass an object in its entirety, serves only as a guide to a comprehensive study, to the study of this object in essence. If we give a definition a different, greater meaning and assume that a definition, insofar as it includes the essential features of a given object, exhausts our knowledge of this object, we would misunderstand the definition, and it would serve not as an aid to the study of objective reality, but as a brake on the path to knowledge.

Regarding the meaning of definitions, we come across remarkable statements by Engels in Anti-Dühring. Engels gives the following biological definition of life: " *Life is a mode of existence of protein bodies...*"[1] And further Engels points out:

"Our definition of life is, of course, very insufficient, since it is far from embracing all the phenomena of life, but, on the contrary, is limited to the most general and simplest among them. All definitions have little scientific value. In order to give a truly exhaustive idea of life, we would have to trace all the forms of its manifestation, from the lowest to the highest. However, for everyday use such definitions are very convenient, and sometimes it is difficult to do without them; they cannot do any harm as long as we do not forget their inevitable shortcomings" [2].

In the preparatory work for Anti-Dühring, Engels wrote: "Definitions are of no importance for science, because they always prove insufficient. The only real definition is the development of the essence of the matter itself, and this is no longer a definition. In order to clarify and show what life is, we must examine all forms of life and depict them in their mutual connection. But for everyday use a brief indication of the most general and at the same time most

[1] *F. Engels*, Anti-Dühring, p. 77.
[2] Ibid., p. 78.

characteristic distinguishing features in a so-called definition is often useful and even necessary, and cannot do any harm, unless the definition is required to give more than it is capable of expressing."[3]

Thus, in order to investigate the essence of any phenomenon, it is not enough to give its definition; it is necessary to do what Engels calls "development of the essence of the matter itself," i.e., to investigate the essence itself in all forms of its manifestation and in all connections of these forms; in other words, it is necessary to conduct a dialectical study. And yet, a definition of the phenomenon also proves useful, a definition that does not claim to express the entire phenomenon in its entirety, but makes it possible to express in a brief formula the most basic, characteristic features of the phenomenon being studied.

Lenin also drew attention to this meaning of the definition. In his work "Imperialism, the Highest Stage of Capitalism," Lenin wrote: "If it were necessary to give the shortest possible definition of imperialism, it would have to be said that imperialism is the monopoly stage of capitalism. Such a definition would include the most important thing..." Lenin further points out: "But definitions that are too short, although convenient because they sum up the main thing, are nevertheless insufficient, since it is necessary to specifically deduce from them the very essential features of the phenomenon that must be defined." Therefore, one should not forget "the conditional and relative meaning of all definitions in general, which can never embrace the comprehensive connections of a phenomenon in its full development..."[1] Based on this, Lenin analyses

[3] Ibid., p. 322.

imperialism in detail in all its basic features, and this analysis does not fit into the form of an ordinary logical definition.

The definition of production relations as social relations of people in the process of production of material goods was given above. This definition is also a brief formulation, summing up the main thing. But, in order to more fully illuminate the content of this concept, it is necessary to point out that the basis of production relations is the ownership of the means of production and that the state of production relations answers the question of who owns the means of production. And this already means "development of the essence of the matter itself" (Engels), i.e. going beyond the limits of a formal-logical definition.

As a conclusion from all of the above, it can be established that *a definition is a short formula expressing the most basic thing in the phenomenon being defined, but far from exhausting the phenomenon itself in all the diversity of its forms, connections and characteristics* .

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The definition of a concept considered in this chapter reveals the content of the concept. Having defined a concept, we learn its content, i.e., those essential features that belong to the objects covered by the concept and distinguish these objects from other similar objects. But in order to understand the objects covered by the concept, it is also necessary to reveal the scope of the concept, i.e., to establish and clarify

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[1] *V. I. Lenin* , Works, Vol. 22, ed. 4, p. 253.

the range of objects that make up the scope of this concept. This is achieved by dividing the concept.

Chapter VI. DIVISION OF THE CONCEPT. CLASSIFICATION

1. Division of the concept. 2. Basis of division. 3. Logical forms similar to division. 4. Rules of division. 5. Classification. 6. Basis of classification. 7. Significance of classification.

§ 1. DIVISION OF THE CONCEPT

The definition of the concept, which we discussed in the previous, Chapter V of this book, reveals *the content of* the concept, i.e. the essential features of those objects, phenomena, events that are covered by the given concept. The disclosure *of the scope of* the concept is carried out by *dividing the concept* .

The division of a concept is called the distribution into groups of those objects and phenomena that fit under a given concept, i.e., make up its volume.

The scope of a concept is all the objects and phenomena to which the concept applies. The scope of a concept is expressed as a class of corresponding objects. We divide this class into smaller classes. This is the division.

It would seem that the scope of a concept can be revealed by listing all the objects to which the concept applies. But, firstly, this is impossible: for example, it is impossible to list all the people in the world, it is impossible to count all the trees, etc. Secondly, this is not necessary, since it is important for us not to specifically indicate all the objects that fit a given concept, but it is important for us to group these objects in such a way as to increase and strengthen our knowledge of them. Therefore, the division of concepts consists in the following: we take some concept and clarify its scope, i.e. we establish which objects, phenomena, things are covered by this concept. Then these objects, phenomena, things that make up the scope of a given concept, i.e. a class, we divide according to similar features into groups, into lower classes. For each such group, or class, a new concept is formed. Each such new concept can be divided in turn, etc.

For example, we take the concept of "tree". The scope of this concept is all the trees that exist in the world. These trees can be divided into coniferous trees and deciduous trees. These two new concepts are *subordinate* in relation to the concept that is divided, i.e. "tree", and *subordinate* in relation to each other. The concept that is divided is a generic concept for those concepts into which it is divided, and these latter, i.e. new concepts, are specific concepts in relation to the concept that is divided.

The concept that is divided is called divisible, and the concepts into which it is divided are called *members of the division* . Therefore, "tree" is a generic concept, divisible, and "coniferous trees" and "deciduous trees" are specific concepts, members of the division.

Another example. According to the Stalin Constitution (Article 5), socialist property in the USSR has two forms: state property and cooperative-collective farm property. The concept of "socialist property" is a generic concept, divisible, while "state property" and "cooperative-collective farm property" are specific concepts, members of the division.

Since the scope of a concept is expressed as a class of objects, the division consists in the fact that the class of objects, which is a genus, is divided into classes, which are species, or, in short, the genus is divided into species.

If the dividend is divided into two classes, such a division is called two-membered, or dichotomy; if it is divided into three classes, it is called three-membered, or trichotomy; if into a greater number of classes, it is called polynomial, or *polytomy*.

§ 2. BASIS OF DIVISION

The division of a concept relates to the scope of the concept, as opposed to a definition, which relates to the content of the concept, but, as we already know, the scope and content of a concept are connected with each other and are in a certain relationship with each other (Chapter IV, §§ 5 and b). Therefore, the disclosure of the scope of a concept, i.e. its division, cannot be carried out without regard to the content of the concept. The division of a concept cannot be expressed in the fact that we simply divide the scope of the concept without regard to its content, so to speak, arrange the objects expressed by the concept into arbitrary groups. For example, if we have 10 centners of vegetables and we arrange them in bags or boxes to make them easier to transport, this is not division. Division consists in the fact that we relate the given objects covered by the concept to different groups on the basis of some specific feature included in the content of the given concept.

The feature of the concept by which the volume of the divisible concept is divided into groups is called the basis of division (principium divisionis).

For example, people can be divided into men and women. Here the basis of division is gender. Students can be divided into successful and unsuccessful. Here the basis of division is the academic performance. Thus, in all cases of division, one attribute is taken, inherent in the concept being divided, and according to this attribute, all objects covered by this concept are divided into groups. People can be divided by age, party affiliation, education, etc. All these attributes—age, party affiliation, education—are the basis of the corresponding divisions.

Any attribute of the concept being divided can be used as a basis for dividing all phenomena or objects covered by this concept. But in order for the division to be scientific or for it to have practical value, it is necessary to take as a basis for division not any arbitrary attribute, but *only an essential* attribute. Let us assume that we divide students in a higher educational institution into brunettes and blondes. Here the basis for division will be hair colour. Formally, such a division will be correct, but it will not have any practical, much less scientific, value. If, for example, we divide students by academic performance, i.e. take an essential attribute, then such a division helps us to better study the composition of the student body, and this will be of great importance both for the use of graduates in practical work and for improving the system and methods of teaching. This means that formally any attribute of division can be taken, but in order for the division to have scientific or practical results, it is necessary to take only essential attributes.

The feature by which the division is carried out is used as the basis for division in the following way: objects that make up the volume of the concept being divided are divided into groups either by *the change in* this feature in each group of objects, or by the presence of this feature in one group and its *absence* in another.

Thus, the division of university students into excellent, good, average and unsatisfactory students is carried out according to the criterion of academic performance, otherwise — according to the change in the criterion of academic performance in each group. The division of teachers of an educational institution into persons with academic titles and degrees, and persons without academic titles and degrees, is carried out according to the presence of the criterion of title and degree in one group and the absence of this criterion in another group.

§ 3. LOGICAL FORMS SIMILAR TO DIVISION

When studying division, it should be borne in mind that there are a number of logical forms that are similar to division but are not division. The following logical forms should be distinguished from division.

1. Dismemberment of an object into separate parts. This dismemberment differs from division in the following way. In division, individual members of the division represent independent separate groups (classes) of objects or phenomena that constitute types of the divisible group (class). For example, if we divide coniferous trees into pines, firs, etc., then this will be division, since each member of the division represents a certain class of independent objects that constitutes a type of the class that is divided. When dismembering an object expressed by a concept, we single out in the object the individual parts of which it consists and which are not types of the divided class, but represent other objects covered by other concepts.

For example, a tree consists of branches, a trunk, bark, etc. Dividing a tree into a trunk, branches, bark, etc. is a dismemberment of an object, not a division of a concept, since the trunk, branches, and bark are not types of the concept "tree," but represent separate parts of a tree, each of which in turn is an object covered by the corresponding concept. Of course, we are not talking about the physical division of an object into parts, but about the mental selection of separate parts in it. Such dismemberment is often necessary for studying an object: we must know what parts a particular plant consists of, what the anatomical structure of animals is, etc.

2. Distinguishing the meaning of the same name or word denoting different concepts. For example, the word "light" means, firstly, the world: "the whole world", "I wanted to go around the whole world, but I didn't go around a hundredth part of it" (Griboyedov, "Woe from Wit"), etc.; secondly, "light" is the electromagnetic radiation of individual atoms and molecules, capable of causing visual sensations in the eye; thirdly, in capitalist countries the concept of "light" is used in the sense of "high society".

Here we do not divide the concept of "light" into three new concepts, but distinguish three meanings of the same word.

3. The arrangement of thoughts according to a certain plan for the purpose of clarity and systematic *presentation*. For example, the significance of higher education consists, firstly, in the fact that it raises a person's cultural level, secondly, in the fact that it provides useful knowledge necessary for practical work, etc. This is not a division of the concept of "higher education", but a systematic arrangement of thoughts characterizing the significance of higher education from different sides.

§ 4. RULES OF DIVISION

The rules that must be observed in order for the division to be correct and of scientific or practical value are as follows.

1. Each division must have only one basis. This means *that each division is made on the basis of some one characteristic and when making a division in relation to all its members it is necessary to be guided invariably by only this one characteristic*. For example, if we divide the employees of some institution or department into persons with higher education, with secondary education and with lower education, then the basis for division for all these three groups will be one characteristic — education, therefore the division is correct.

If these workers are divided into those with higher education, those with secondary education, and those with practical work experience, the division will be incorrect, since the first two groups are formed based on education, and the third based on practical work experience, i.e., on a completely different basis.

This first rule of division is of great practical importance, therefore, when we divide objects into groups, we must ensure that the division is made on the basis of some one characteristic, and not on the basis of various characteristics.

2. The members of the division must exclude each other. This means that when dividing objects into groups according to some feature that is the basis of the division, each individual object must be in only one group, and not more than one. If we divide trees into coniferous and deciduous, then this division will be correct, since the members of the division exclude each other: a coniferous tree cannot be deciduous at the same time, a deciduous tree cannot be coniferous at the same time, each tree can be either in the coniferous group or in the deciduous group, but cannot be in both; therefore, the division is correct.

Let's take an example of a different order. People are often divided into scientific and practical workers. As if this is correct, since the basis of this division is the nature of the work performed, but this division is inaccurate, because there are quite a large number of people who are both scientific and practical workers. Consequently, the same subject can be in two groups, both groups are not mutually exclusive.

The correct division would be into three groups: a) persons engaged only in scientific work, b) persons engaged only in practical work, and c) persons engaged in both scientific and practical work.

3. The members of the division in relation to the concept being divided must be the closest types, i.e. immediately lower concepts, and in relation to each other, subordinate concepts. This means that when we divide any class of objects into lower classes, these lower classes into which the divisible class is divided (division members) must be immediately lower, i.e. must be immediately adjacent to the divisible class. Consequently, the divisible concept must be the closest genus (genus proximum) for the division members. For example, vertebrates are divided into the following classes: fish, amphibians, reptiles, birds and mammals, and then each of these classes is divided into further species. But vertebrates cannot be divided immediately into smaller groups, bypassing the indicated classes.

4. The members of the division, taken together, must be equal to the volume of the concept being divided. We divided the concept A into the concepts *B* and *C* ; this will be correct if $B + C = A$. If we divide A into three concepts *B*, *C* and *D* , then this division will be correct when $B + C + D = A$. In *the* above example of dividing vertebrates into five classes, we see that the sum of these five classes covers all vertebrates, equals the entire volume of the concept “vertebrates”; therefore, the division is correct.

Now suppose someone divides triangles into acute and obtuse. This division is incorrect, since acute and obtuse triangles do not constitute all triangles in general; there are also right triangles.

5. The basis of division must be a feature indicating an essential difference between the members of the village. We have already spoken about this when we set out the very essence of division. We pointed out that objects can be formally divided by any feature, but if a feature that is not essential is taken as the basis of division, then this division will have no meaning. We will find a very curious illustration of such a division based on nonessential features in Swift’s remarkable work, Gulliver’s Travels. In one mythical state, people were divided into two parties that were hostile to each other. The feature that divided these warring parties was the fact that the supporters of one party broke eggs from the sharp end, and the supporters of the other from the blunt end; some were called “pointy-enders,” others “blunt-enders.” Indeed, a remarkable “basis of division”!

Here is another example of incorrect division. At the Paris Peace Conference, representatives of bourgeois countries expressed opinions that the countries participating in the conference were divided into two groups: the Slavic group and the Western group. In this regard, V. M. Molotov, pointing out that the Soviet delegation was striving to strengthen cooperation between all democratic countries, said the following:

“But first of all we must recognize as artificial such a division at the conference, according to which the Slavic group is opposed to the Western group and vice versa. There should be no place for such an opposition. It smacks of something belated — of the times when the East was politically backward, which in our day cannot be said at all when comparing the young Slavic democracies with the typical old democracies of the West” [1].

Comrade Molotov later revealed the incorrectness of this division of the conference participants; it conceals attempts to isolate the young Slavic democracies—people’s republics defending their independence and not wishing to follow someone else’s orders. But even from a logical point of view, this division does not stand up to criticism. If only an ethnographic feature—Slavic

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[1] *V. M. Molotov*, Speeches at the Paris Peace Conference, p. 135.

and non-Slavic countries—is taken as the basis for the division here, then, firstly, this feature in itself does not determine the political positions of certain conference participants, therefore, this feature is not essential in such a division, and secondly, this feature is not maintained, since the USSR does not consist of only Slavic peoples. If, however, the feature of political development is taken as the basis for the division, then the Slavic people's republics are not lower, but higher than the old "democracies". But the division can be made differently, as it was defined later, at a conference of nine communist parties in September 1947, by A. A. Zhdanov: all modern states are divided into two groups, into two camps — the imperialist and anti-democratic camp, and the anti-imperialist and democratic camp [1] . Such a division, based on the most essential political feature, the political system and the direction of policy, is completely correct both in essence and from the logical side. But, of course, the representatives of the imperialist and anti-democratic camp do not dare to pose the question in this way, they do not dare to openly put forward such a basis for division and try in every way to disguise their aggressive imperialist policy.

§ 5. CLASSIFICATION

A special form of division is classification.

Classification is the division of objects into classes based on the similarity of objects of each class and their differences from objects of other classes in the most essential features, carried out in such a way that each class among other members of the division occupies a certain permanent place.

This means that any classification is a division (a special form of it), but not every division is a classification. Any division can be made for some practical purpose, and it is discarded, loses its meaning, when this purpose is achieved. Classification, once created, acquires a stable character, is preserved until it is replaced by a new, more successful classification. Classification is usually not just a two-member or multi-member division, but a division, each member of which in turn is subject to further division. Thus, in classification, division is consistently carried out from top to bottom, from the upper class to the lower classes.

All objects covered by the concept are successively distributed into classes. Each class is in turn divided into lower classes, each of these latter classes is in turn divided into even lower ones, etc. Thus, the classified objects as a result of classification form a harmonious and Fig. a detailed system, and each member of the classification receives its own permanent, stable place

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[1] See "Information meeting of representatives of some communist parties in Poland at the end of September 1947", 1948, p. 22.

in this system. An approximate classification scheme will be as follows: the divisible concept A is divided into two lower concepts *B* and *C*; *B* is also divided into two lower concepts *D* and *E*, and *C* into *K* and *L*; each from these latest concepts is also divided into two lower concepts, etc. All of this taken together will be a classification, because all objects are divided into groups from top to bottom and each of these groups occupies a certain place (see Fig. 8).

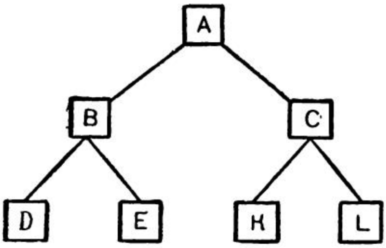

Рис. 8

Classification is widely used in the natural sciences. For example, in botany and zoology, a significant part of these sciences is the so-called taxonomy, which aims to describe and classify all species of plants and animals by dividing them into certain groups, each of which is subject to further division. For example, in zoology, animals are divided into types: protozoa, coelenterates, sponges, worms, mollusks, arthropods, echinoderms and chordates; types are divided into subtypes; thus, chordates are divided into the subtype of acrania and vertebrates; the last subtype (vertebrates) is divided into classes — fish, amphibians, reptiles, birds and mammals; the last class (mammals) is divided into subclasses — monotremes, afterbirth and afterbirth animals. Classification is also very important in other sciences, for example, in mathematics (classification of geometric figures in geometry). It is in these sciences that classification is carried out in the form of a sequential division from the upper class to the lower classes. In the social sciences, classification is also of great importance. In the social sciences, classification is usually carried out in the form of dividing any objects into corresponding classes, without the obligatory further division of each class. Such a classification is similar in appearance to ordinary division, but still remains a classification due to the stability of the division, the constant position of the members of the division due to the essentiality of the features by which the division of objects into groups is carried out. Such is, for example, the classification of socio-economic formations representing the stages of the historical development of society: primitive communal system, slave-owning, feudal, capitalist and socialist systems. This is a classification of social forms by the main, essential feature — by the types of production relations.

Another example: the classification of philosophical systems and theories into materialistic and idealistic, depending on what they recognize as primary, determining—matter or consciousness, being or thinking. Such a classification takes as its basis the most important and essential, and not all sorts of secondary and derivative features, as bourgeois historians of philosophy do.

§ 6. BASIS FOR CLASSIFICATION

As we have already indicated, in each division the basis of division (pripsipium divisionis) must any essential feature must be taken. The basis of the classification must be not one of the essential features, but the most essential feature — the one on which all other features of the classified objects and phenomena depend and from which follow; otherwise, the stability of the classification and the constancy of the place in it for each member of the division will not be achieved. In simple division, we can take as the basis of the division any feature that is essential for any purpose (for example, the age of people, the material or purpose of furniture, the language in which books are written, the degree of suitability of a thing for use in the household, etc.). Such a feature is not enough for classification, the basis of the classification must be strictly scientific, objective, must represent a feature that is decisive for a particular group of objects. This, for example, is clearly visible in the above classification of social forms. The basis of this classification — the type of production relations — is indeed a scientific basis and represents such an essential feature on which all other features of a particular social system (state and legal forms, ideology, culture, etc.) depend and by which all other features of a particular social system (state and legal forms, ideology, culture, etc.) ultimately are determined. The same applies to the classification of philosophical systems into materialistic and idealistic.

In bourgeois logic, a distinction is sometimes made between artificial and natural classification. An artificial classification is a classification based on some arbitrarily chosen feature that is important from a practical point of view for the purposes of the research being conducted or some work. A natural classification is a classification based on a feature determined by the nature of the phenomena being studied, their “nature”. It must be said that the very distinction between natural and artificial classification is highly artificial: an artificial classification is not a classification in the scientific sense, but a simple division carried out according to some feature that is essential only for some practical purpose.

As an example illustrating the difference between artificial and natural classification, the classification of plants in botany is sometimes cited. The Swedish naturalist Carl Linnaeus (1707-1778) created a classification of plants in which the number of stamens and the way they are attached to flowers were taken as the basis for dividing plants. According to this feature, all plants were neatly arranged in groups (classes). But since a random feature was taken as the basis for classification, not determining other features of plants, then very different plants (for example, oak and violet) ended up in one general group, and similar, related plants (for example, cereals) ended up separated, placed in different groups.

The new classification of plants takes as a basis for division a number of essential features establishing the kinship of plants united in one group, the commonality of their origin, so that in one group there are truly homogeneous plants. This is a truly scientific classification.

But from this illustration it is clear that in essence the issue is not that the first classification is artificial and the second is natural, but that Linnaeus’ classification was less successful in scientific terms than the second classification, as a result of which this first classification, which at one time played a certain role in natural science, was replaced by a new one with the progress of science. In the history of science this happens all the time: classifications, at one time recognized as scientific, were subsequently replaced by others, based on new achievements of science.

The distinction between natural and artificial classification is unscientific, incorrect. Every classification must have a scientific basis. If the classification is unscientific, it must be recognized as incorrect, unacceptable. In the work “Herr Vogt” Marx refers to the following curious fact: “As is well known, the specialist in secret diseases, Dr. *Rademacher*, classifies diseases according to their remedies” [1]

§ 7. SIGNIFICANCE OF CLASSIFICATION

Classification built on a scientific basis is of great importance in science, helps in the study of various objects and phenomena, and in the discovery of patterns that govern these objects and phenomena.

Classification primarily helps in studying various objects and phenomena to cover them and find a certain connection between them.

If we study various objects, but they are not classified, not divided into classes, not arranged in a certain systematic order, then it will be difficult for us to study these objects: there are many of them, it is

[1] *K. Marx* and *F. Engels* , Works, Vol. XII, Part I, p. 259.

impossible to cover them all without exception. Indeed, botanists cannot study all the individual plants, and zoologists — all the individual animals. If the objects are arranged in a systematic order, divided into groups, each group into smaller groups in such a way that each group occupies a certain stable place, then we can obtain knowledge about all the objects of a given genus, although we do not observe each of them directly; and when we meet with some new object of this genus, we find in the classification the group to which it belongs, and thereby learn its properties. Scientifically based classifications can serve as a means for new discoveries, for discovering patterns in a particular area of scientific research.

A remarkable example of such a scientific classification is the periodic table of chemical *elements*, created by the great Russian scientist D. I. Mendeleyev (1834-1907). Mendeleyev constructed a classification of chemical elements, in which the division is based on the atomic weight of various elements. Mendeleyev proceeded from the fact that there is a certain relationship between the atomic weight of the elements and the properties of the elements themselves and their compounds. The elements were classified by atomic weight in ascending order, and the classification obtained in this way included 92 elements. But at that time, only 63 elements were actually known, and there was a gap in the classification regarding the unknown 29. However, the subsequent development of chemistry led to the discovery of 27 missing elements, so that only two remained unknown. Thus, Mendeleyev's classification, based on a certain pattern (the relationship between the atomic weight of the elements and their chemical properties), served as a means for the discovery of new, previously unknown elements.

In order to correctly assess the significance of classification, it is necessary to keep in mind the following. Scientific classifications are not immutable, frozen, established once and for all. The development of science leads to the fact that classifications of the same objects change: some classifications are discarded as incorrect, others are replaced by new, more perfect ones, and others, although they retain their basis, are supplemented and modified.

In bourgeois science of the state, the classification of states by form of government—monarchies and republics—was and is still used as the main one. In the past—in the 18th and partly in the 19th century—this classification really did have serious significance, since the differences in these forms indicated significant differences in political regimes, in social development, etc. But now such a classification has lost its former significance, since the forms of government of bourgeois states are characterized not by whether the head of state is a hereditary monarch or an elected president, but by many other features: the presence of a military machine serving the interests of the ruling capitalist clique, a bureaucratic state apparatus, etc. It is known that in the USA the president has incomparably more power and influence on state affairs than the king in England, who is largely a decorative figure. True, even now the monarchical form continues to be a symbol of conservatism, inertia, reaction, but in itself the republican form of government of a bourgeois state says nothing and does not testify to anything: the USA is a republic, but in it the fascisation of the political regime is taking place, and the ruling imperialist circles are now a stronghold of world reaction.

By its logical nature, classification draws sharp distinctions between the classes that make it up: according to the second rule of division, the members of the division must exclude each other; an object belonging to one group cannot at the same time belong to another group. But the dialectical method in science shows that between individual classes of objects and phenomena there are intermediate forms, transitions from one type to another. Engels wrote in his Dialectics of Nature: " Hard and fast lines / *absolutely sharp dividing lines* / are incompatible with the theory of development. Even the dividing line between vertebrates and invertebrates is no longer absolute, just as between fish and amphibians; and the boundary between birds and reptiles is disappearing more and more every day" [1] . Classification always operates with such concepts as species, genus, class, accordingly distributing the classified objects. Engels pointed out that these concepts "thanks to the theory of development have become fluid and thus relative..." [2]

All this gives classification a relative character. In this relative sense, classification continues to be a serious means of scientific knowledge. Science studies and investigates the corresponding phenomena not only in a state of development, change, but also in a state of relative stability, as if interrupting this development. It is impossible to study changes without firmly establishing what is changing; it is impossible to study intermediate forms and transitions between types of

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[2] Ibid., p. 182.
[1] *F. Engels* , Dialectics of Nature, p. 169.

phenomena without definitely establishing those types of phenomena between which these intermediate forms and transitions exist. And for these purposes, classification is an indispensable means, because it is impossible to organize and systematize the objects being studied otherwise than in the form of classification.

* * *

We have completed our examination of the concept as a form of thinking that reflects the general and essential characteristics of objects and phenomena of objective reality.

Let us move on to considering another, more complex form of thinking—judgment.

Chapter VII. JUDGMENT

1. The logical nature of judgment. 2. The composition of judgment. 3. The relationship between the subject and the predicate of judgment. 4. The so-called "judgments of relationship". 5. Types of judgments. 6. Division of judgments by quantity (volume). 7. Division of judgments by quality (content). 8. Combination of divisions of judgments by quantity and by quality. 9. Division of judgments by the nature of the connection between the subject and the predicate. 10. Division of judgments by the degree of importance for the subject of the feature expressed by the predicate. 11. Distribution of terms in judgment.

§ 1. THE LOGICAL NATURE OF JUDGMENT

A judgment is a statement about objects and phenomena of objective reality, consisting of an indication of their belonging or absence of certain characteristics.

Examples of judgments: "The Great Patriotic War of the Soviet people ended with a brilliant victory of the USSR over the fascist invaders"; "science contributes to the development of the economy and culture"; "Soviet science is the most advanced science in the world"; "citizens of the USSR are obliged to sacredly observe Soviet laws"; "the destruction of the remnants of capitalism in the minds of Soviet people is the most important task of our time"; "the geographic environment and population density are not determining forces of social development", etc. Whenever we express any thought, affirm or deny something, communicate any information, draw attention to any features of objects or phenomena of reality, we do this in the form of a judgment .

A judgment is *a logical form of expressing a thought*.

Human consciousness reflects objective reality, which is outside of consciousness and independent of it. In The German Ideology, Marx and Engels pointed out: “Consciousness (das Bewusstsein) can never be anything other than conscious being (das bewusste Sein)...»[1] Thought is such an awareness of some object, phenomenon, event, fact of reality, one or another of their properties, states, which is expressed in judgment.

A judgment is always a statement of something about something: we state the existence or non-existence of some object, point out the presence of some property or the absence of this property, evaluate this object from a certain point of view, put it in connection with other objects, etc. The thought expressed in the judgment can be simple or complex, can be completely clear and indisputable and, on the contrary, may require clarification and proof of its correctness. The thought can be convincing, reasonable, it can be false, absurd, but, considered from the logical side, it cannot be expressed otherwise than by saying something about something, i.e. in the form of a judgment. We can make this statement orally or in writing, thereby communicating our thought to other people. We can keep the thought to ourselves, in which case we express it in our consciousness to ourselves. But whenever we formulate our thoughts, we do so in the form of a judgment, in which we speak of something,

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[1] *K. Marx and F. Engels* , Works, Vol. IV, p. 16.

attribute something to something, or deny something to something. The great Russian teacher K. D. Ushinsky (1824-1870) explains the essence of judgment very well: “In everything we say and think, there is certainly a judgment. Every thought in our head, every phrase, if only it has some meaning, certainly contains a judgment”[2].

Indeed, judgment is the basic form in which thinking takes place, and it is in judgment that the result of any thought process is formulated. A formed thought is always expressed in judgment.

Since a judgment expresses a thought about objects and phenomena of reality, every judgment has the following two properties: 1) it affirms or denies something and 2) it is either true or false.

In any judgment, something is affirmed or denied in relation to something: it is indicated that a given object of thought has certain properties or does not have them, belongs to a certain class of objects, phenomena or does not belong to it. If a particular statement does not affirm or deny anything, it is not a judgment. A judgment is always an affirmation or a negation.

In this case, the grammatical, verbal expression of the judgment is not important. This grammatical form, for example, can be exclamatory or interrogative, but in meaning it contains an affirmation or a negation.

Let us take the following statement by A. A. Zhdanov in his speech at the discussion of G. F. Alexandrov’s book “History of Western European Philosophy” (June 16-25, 1947): “Who, if not us — the country of victorious Marxism and its philosophers — should lead the fight against the corrupt and vile

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[2] *K. D. Ushinsky*, Children's World, part 2, 1872, p. 274.

bourgeois ideology, who, if not us, should deal it crushing blows!" [1] Grammatically, the exclamatory form is taken here, which also includes the form of a question. But this is a categorical judgment and precisely an assertion, expressing the idea with exceptional clarity: we, precisely we, must lead the fight against bourgeois ideology, this is our duty and our task.

Further, a judgment, insofar as it expresses a thought about objects, phenomena of reality, can be either true or false. A judgment is true if it correctly reflects objective reality, and false if it incorrectly reflects this reality. If a judgment affirms something that exists in reality, or denies something that does not exist in reality, it is a true judgment. If a judgment affirms something that does not exist in reality, or denies something that does exist in reality, it is a false judgment.

§ 2. COMPOSITION OF THE JUDGMENT

Every judgment is a connection of concepts; in it, concepts are connected in a special way. If we consider the judgments that we constantly express in our everyday life, we will see that in every judgment there are three elements: 1) *the subject* , 2) *the predicate* , and 3) *the copula*. The subject of a judgment is *what* we say in the judgment. The predicate of a judgment is what we say about the subject. The copula is an

[1] 1 *A. A. Zhdanov*, Speech at the discussion on the book by G. F. Alexandrov "History of Western European Philosophy", p. 44.

indication of the relationship that exists between the subject and the predicate.

Let us take the following judgment: "Mother" by Maxim Gorky is one of the greatest works of world literature." The subject here is "Mother" by Maxim Gorky, since this is the work that is being discussed in this judgment. The predicate here is "one of the greatest works of world literature," since this is what is being said about the subject. The copula here is "is," since this is what expresses the connection that exists between the subject and the predicate.

Another example: "The Michurin trend in biology is a creative development of Darwin's teaching, a new, higher stage of materialistic biology." In this judgment, the subject is "the Michurin trend in biology," since it is what is being discussed; the predicate is "a creative development of Darwin's teaching, a new, higher stage of materialistic biology," i.e., this is what is being asserted about the subject; the copula is "is" (grammatically expressed by the word "is").

The subject in logic is conventionally designated by the letter *S* from the Latin word Subjectum, the predicate in logic is designated by the letter *P* from the word Praedicatum. Hence the subject is also called the subject, and the predicate is called the predicate.

Thus, the above judgments can be expressed by the formula:

$$S \text{ is } P$$

In any judgment, the subject and predicate are concepts connected by means of a copula. The subject and predicate may include not one, but several concepts. "Treason is the gravest crime"; in the subject we see two concepts — “treason” and “homeland”, in the predicate also two — “the gravest crime” and “crime”. But logically in a judgment the subject, as well as the predicate, appears as one concept, although expressed in several words: the subject is one object of thought, in this case “treason”, and the predicate is also one object of thought — “the gravest crime”. The subject and predicate in a judgment are called *terms of the judgment*.

The copula in a judgment is expressed by the word “is” or “is not”. Often the copula in a judgment is not pronounced, not designated, but implied, for example: “my brother is a good man”. If the thought in a judgment is expressed negatively, i.e. the predicate states about the subject that it is not something, the copula is expressed as “is not”, for example: “this flower is not a rose”. If the subject is a general concept and expresses a set of objects, the copula is designated as “essence” (or “not essence”), for example: “birds are vertebrates”.

In the examples given, the subject, predicate, and copula in the judgment are immediately apparent from the very construction of the judgment, but in a number of cases the subject and predicate of the judgment, as well as the copula, are not so easily detected, and in order to find and indicate them, it is necessary to subject the judgment to logical analysis. Let us take, for example, the following judgment: “in order to learn a foreign language well, one must study it regularly and intensively.” Where is the logical subject and logical predicate here? This is not immediately apparent. In order to find the subject here, it is necessary to establish what, what object, the judgment is talking about. This judgment talks about learning a foreign language well, which is achieved through regular and intensive study. Consequently, the subject here is learning a foreign language well. The predicate here is what is said about the subject, in this case, that this is the result of regular and intensive study.

Any judgment can be constructed in such a way that its logical elements—subject, predicate, connective—are separately expressed in it.

In order to understand the meaning and sense of a judgment in logic, it is necessary to establish *the difference between a logical judgment and a grammatical sentence*.

A judgment is an act of thinking that reflects objective reality. A sentence is a grammatical expression of a judgment, i.e. an expression of a judgment in words, a verbal form of a judgment. A judgment cannot be expressed otherwise than in words, even if we have made this judgment mentally, to ourselves; equally, it is impossible to understand a judgment otherwise than through its verbal expression (even if we have expressed a judgment with a gesture, facial expression — words are still implied).

Thus, a sentence is a grammatical form of a judgment, and a judgment is the logical content of a sentence.

There is no complete coincidence between the constituent parts of a judgment and the sentence expressing it. Thus, the link expressed by the verb is a predicate in a sentence, and a separate element in a judgment, distinct from the predicate. The complement in a sentence is a separate element, and in a judgment it is part of the predicate.

Logic deals with judgments, and grammar deals with sentences. Therefore, in the following exposition we will speak of judgments, not of sentences, and we will keep in mind that a judgment is expressed in a sentence; when we utter, hear, or read a sentence, we need to uncover the judgment contained in it, the logical elements of which may not coincide with the grammatical elements of the sentence.

§ 3. RELATIONSHIP BETWEEN THE SUBJECT AND THE PRECEDENT OF A JUDGMENT

A judgment expresses the connection between two concepts—subject (*S*) and predicate (*P*), the relationship between them. What are the relationships between the subject and predicate of a judgment? The subject and predicate of a judgment are concepts, and like any concept, each has its own scope and content. Let us recall that the scope of a concept is all the objects to which the given concept applies, and the content of a concept is the essential features of the objects that fit the given concept (Chapter IV, §§ 5 and b). The connection between the subject and the predicate exists both in relation to the scopes of the subject and predicate, and in relation to their content. This means that if a concept that is the subject and a concept that is the predicate are related to each other, then their scopes and content are also related.

The connection between the volumes of the subject and predicate of a judgment is expressed in the fact that the volume of the subject is included in the volume of the predicate or excluded from it.

In those cases where a judgment asserts something about the subject, the scope of the subject is included in the scope of the predicate.

In those cases when something is denied in a judgment in relation to the subject, the scope of the subject is excluded from the scope of the predicate.

Let us explain this with examples.

In the judgment “Soviet pilots are fearless, selfless people,” the scope of the concept of the subject “Soviet pilots” is included in the scope of the broader concept of the predicate “fearless, selfless people.”

In order to clarify the connection of the subject with the predicate in each judgment by volume, it is necessary to clearly express the volumes of the subject and predicate in this judgment. This can be done in the following way: the concept of the subject and the concept of the predicate must be given such a form that they express classes of objects. Many judgments are such that the classes of objects of the subject and predicate are quite clearly visible. For example, “horses are herbivores”; in this judgment, the class of objects constituting the volume of the subject “horses” is included in the class of objects constituting the volume of the predicate “herbivores”. The relationship of the volumes of the subject and predicate can be graphically designated here as follows (see Fig. 9).

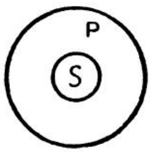


Рис. 9

Another example: “whales are not fish” (i.e. whales are not fish). In this judgment, the class of objects of the subject “whales” is excluded from the class of objects of the predicate “fish”. The relationship of the volumes of the subject and predicate here can be graphically designated as follows (see Fig. 10).

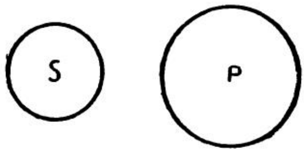


Рис. 10

However, many judgments are constructed in such a way that the concepts of subject or predicate, or both, are not expressed in the form of classes of objects. In order to establish the relationship of the volumes of the subject and predicate in such judgments, these judgments must be restructured, expressed in such a way that the subject and predicate appear as classes of objects.

For example, in the judgment “scientists are working on problems important for the economic and cultural life of our country,” the subject is clearly expressed as a class of objects: “scientists,” i.e. people engaged in scientific activity, but the predicate is not expressed in this way, and the class of objects is not visible in it. This judgment can be constructed in this way: “scientists (*S)* are (a link) people working on problems important for the economic and cultural life of our country (*P*).” In this judgment, the predicate is "people working on problems important for the economic and cultural life of our country," i.e. a class of objects. In this judgment, the volume (class) of objects in the subject is included in the volume (class) of objects in the predicate.

This is the connection between the subject and the predicate in relation to their volumes.

The connection between the subject and the predicate in relation to their content is different.

The connection between the subject and the predicate in terms of content consists in the fact that in a judgment the content of the predicate is included in the content of the subject or excluded from it.

In those cases where a judgment asserts something about the subject, the content of the predicate is included in the content of the subject.

In those cases when something is denied in a judgment in relation to the subject, the content of the predicate is excluded from the content of the subject.

Let's give some examples.

"Public education in the USSR is a matter of great national importance." This judgment indicates that the subject "public education in the USSR" has features that constitute the content of the predicate "a matter of great national importance," therefore the content of the predicate is included in the content of the subject.

"All laws are subject to strict execution." Here, in relation to the subject "laws", the features belonging to it are indicated, which constitute the content of the predicate — "the obligation of strict execution", therefore, the content of the predicate is included in the content of the subject.

"No living creature can live without air and food." Here the subject "living creature" is denied the attribute that constitutes the content of the predicate — “the ability to live without air and food”, therefore, the content of the predicate is excluded from the content of the subject.

By combining both forms of connection between subject and predicate (in relation to volume and content), we can give the following general formula: *in a judgment, the volume of the subject is included in the volume of the predicate or excluded from it, and the content of the predicate is included in the content of the subject or excluded from it*.

To explain this even better, we can say this: *if the volume of the subject is included in the volume of the predicate, then the content of the predicate is included in the content of the subject (i.e., an inverse relationship is obtained). If the volume of the subject is excluded from the volume of the predicate, then the content of the predicate is excluded from the content of the subject (also an inverse relationship)*.

In any judgment we find precisely these forms of connection between the subject and the predicate simultaneously both in volume and in content, and both forms of connection are in an inverse relationship to each other. However, based on *the meaning* of judgments, in some judgments the connection between the subject and the predicate in volume comes to the fore, in other judgments — their connection in content.

Let’s give some examples.

“Birds are vertebrates.” The predicate here expresses a certain class of living beings—”vertebrates,” and “birds” are included in this class. This means that there is a connection between the subject and the predicate by volume, and from this it follows that the characteristics of vertebrates are also characteristic of birds (i.e., a connection by content).

"The workers of this plant participate in socialist competition and successfully fulfil their socialist obligations." If we express the connection between the subject and the predicate in this judgment by volume, we get: "the workers of this plant (subject) are (link) people participating in socialist competition and successfully fulfilling their socialist obligations (predicate)". The volume of the predicate here is "people participating in socialist competition and successfully fulfilling their socialist obligations", which includes the volume of the subject, i.e. "the workers of this plant". But, having constructed the judgment in this way, we see some of its artificiality. Of course, even in this form the judgment makes sense: the workers of this plant are included in the number of workers engulfed in competition and shock work and fulfilling their obligations, they constitute part of the advanced workers of our country. But the meaning of the judgment "the workers of this plant participate in socialist competition and successfully fulfil their socialist obligations" is not in this, not in the inclusion of the volume of the subject in the volume of the predicate, but in the fact that in relation to the subject "the workers of this plant"^ a certain feature of them is indicated, which constitutes the content of the predicate — participation in socialist competition and the successful fulfilment of their socialist obligations.

Here is another example. "A rose is a flower." Here the scope of the subject "rose" is actually included in the class of the predicate "flower" (flowering plant). This means that here the connection between the subject and the predicate is by scope. "The roses in this garden are red.” Here the predicate points to a certain feature of the subject — the colour red; this means that here the connection between the subject and the predicate is by content. Of course, this judgment can also be constructed in such a way that the connection between the subject and the predicate by scope is visible: “these roses are objects that are red.” With such a construction of the judgment, the class of the subject is simply included in the class of the predicate — objects of the colour red. But it is absolutely clear that the class of objects of the colour red is an artificial form, created specifically in order to make it possible to connect the subject and the predicate by scope, while the meaning of this judgment is expressed by the connection between the subject and the predicate by their content.

§ 4. ON THE SO-CALLED “RELATIONSHIP JUDGMENTS”

The above regarding the structure of a judgment, i.e. its constituent parts and their relationships, allows us to conclude that from the formal-logical side all judgments are of the same type, i.e. they have the same logical structure: the subject (*S*) and the predicate (*P*) are connected by the link “is” (the essence) or “is not” (not the essence); at the same time, in all judgments the subject and the predicate are connected by volume (the inclusion of *S* in the class *P* or the exclusion from it) and by content (the belonging of *S to* the attribute *P* or the absence of this attribute in *S*).

From all that has been stated above concerning judgments it follows that judgments cannot be divided into judgments in which the subject and predicate are connected by volume, and judgments in which the subject and predicate are connected by content, since in each judgment the subject and predicate are connected both by volume and by content. Indeed, each concept has a volume, i.e. objects, subjects to which it is applicable, and a content, i.e. the signs, properties of these subjects, which are expressed in the concept. As a result, the connection of concepts is always a connection of these concepts both by volume and by content. Another thing is that in some judgments, according to their meaning, the connection by volume comes to the forefront, and in others, the connection by content: we talked about this above, but this does not serve as a basis for dividing (classifying) judgments.

In the history of formal logic, an attempt was made long ago to single out a special type of judgments, the so-called "judgments of relation", in which the relation of objects to each other is expressed (the English logician Morgan, the French logician Lachelier). Sometimes, from the point of view of these "judgments of relation", an attempt was made to abolish the old, "Aristotelian" logic (the Russian logician Povarnin), sometimes they limited themselves to merely supplementing the old logic with this new type of judgment (the Russian logician of the 19th century Karinsky). The construction of judgments according to the type of "judgments of relation" served as the starting point for an entire trend in bourgeois logic — the so-called "logic of relations". This is a very widespread trend in modern bourgeois literature on logic.

Let us first see what “relationship judgments” are as interpreted by the representatives of this trend. The essence of “relationship judgments” is briefly as follows. “Relationship judgments” express the relations that exist between different objects. These relations can be of the most varied kinds: relations in space, relations in time, relations of magnitude, relations of kinship, etc. For example, the judgment “Elbrus is higher than Mont Blanc” expresses the relation between Elbrus and Mont Blanc by their height. The judgment “Leo Tolstoy was born later than Turgenev” expresses the relation between L. N. Tolstoy and I. S. Turgenev by the time of their birth. The judgment “Ivan is Peter’s brother” expresses the relation between Ivan and Peter by kinship. For such judgments, not the usual formula of judgment is used: S is (is not) *P* , but a different formula: *aRb*. In this formula, *a* and *b* are objects between which a relation exists, and *R* denotes the relation itself, which exists between *a* and *b* (relation in Latin is Relation , in French is Relation). Authors who distinguish “relation judgments” from other judgments see in “relation judgments” a special type (or kind) of judgments, which cannot be reduced to judgments in which one class of objects is included in another class or excluded from it (relationship of *S* and *P* by volume) and in which, relative to the subject, the feature present or absent in it is indicated (relationship of *S* and *P* by content).

It must be admitted that such a construction is incorrect and there are insufficient grounds for distinguishing a special type of “judgments of relation.” What draws attention to itself in these judgments is, first of all, that the relations expressed in them are not only varied and multiform, but simply innumerable. Any relations will do here — of time, space, causality, kinship, size, friendship, love, hate, force — in a word, anything that can be cited as examples, but which can neither be listed nor systematized. These are relations, many of which have nothing in common with each other, as a result of which the relation itself loses all definiteness of content.

"Elbrus (*a*) is higher (*R*) than Mont Blanc (*b*)", "Ivan (*a*) loves (*R*) Peter (*b*)", "A cold (*a*) is the reason (*R*) for my illness (*b*)", " 2x2 (*a* = (*R*) 4 (*b*)", "camels (a) are more resilient (*R*) than horses (*b*)", "summer nights (a) are shorter (*R*) than winter ones (*b*)", "the hunter (*a*) shot (*R*) at the bird (*b*)", "I (*a*) bought (*R*) a new suit (*b*)". There are as many such examples as you like. The whole question is whether these and similar judgments represent some special type (or kind, or class) of judgments, or whether they are ordinary judgments of an ordinary logical structure (*S* is *P*).

Let us take as an example the judgment: "Elbrus is higher than Mont Blanc". This judgment may have the following logical structure: "Elbrus is a mountain higher than Mont Blanc". This judgment follows the usual formula of the judgment "S is P". The subject here is "Elbrus", the predicate is "a mountain higher than Mont Blanc". From the point of view of volume, in this judgment the subject is included in the class of objects covered by the predicate, from the point of view of content the predicate ascribes to the subject a feature — a height exceeding the height of Mont Blanc. Therefore, this is an ordinary judgment " *S* is *P* ". It is transformed into a judgment of a special type, a "judgment of relation", in the following way: some part is artificially isolated from the content of the predicate and transferred to the bundle, which thereby turns into a relation, and the relation itself turns out to be not a logical connection of concepts, but any connection of objects.

This can be seen in the same example: “Elbrus is a mountain higher than Mont Blanc.” The predicate here is “a mountain higher than Mont Blanc.” From this predicate, the attribute of height (higher than, or higher) is isolated and made a separate part of the judgment, called a relation, which corresponds to the copula in an ordinary judgment, and the result is the so-called “judgment of relation.” *aRb* — “Elbrus is higher than Mont Blanc.”

These considerations apply to any judgment considered as a “judgment of relation”: for example, “Ivan loves Peter” — “Ivan is a man who loves Peter”. From the predicate of this judgment, the attribute of love is isolated and made an independent part of the judgment. Of course, with regard to the latter judgment one can point out the artificiality of the construction of the predicate as a class of “people who love Peter”. We considered this issue above, when we spoke about the relations of the subject and the Predicate in terms of volume and content (§ 3): the artificiality of the construction of the predicate as a class of objects can also take place in a judgment that has nothing in common with a “judgment of relation”. The point is obviously that in many so-called “judgments of relation” their meaning lies in the relation of the subject and the predicate in content, and not in terms of volume: “Ivan loves Peter” — this means that the predicate ascribes to the subject “Ivan” a certain attribute — love for Peter; Ivan is said to love Peter / and this corresponds to the usual pattern of judgment “*S* is *P*”.

The incorrectness of the construction of "relational judgments" can be illustrated by an example that has already been given: "Elbrus is higher than Mont Blanc." We can say: "Elbrus is a very high mountain"; this will be an ordinary judgment " *S* is *P* ," in which the subject "Elbrus" is ascribed the attribute of great height. If we say: "Elbrus is higher than Mont Blanc," in this judgment, as in the first, we ascribe to the same Elbrus the same attribute of great height, but we do this more definitely, since the height is determined relative to another mountain — Mont Blanc. We can express this attribute of Elbrus's height even more definitely in the following judgment: "Elbrus reaches a height of *S* 633 meters." The logical structure of these judgments is the same, and there is no reason to give one of them a special form and classify it as a special type only because in it the height of Elbrus is determined relative to another mountain.

Different sciences study different relationships, i.e., relationships between different phenomena of reality. Such, for example, are quantitative relationships, studied by the mathematical sciences, social relationships, studied by the social sciences, etc. Mathematics can study the relationships that constitute its subject matter, using logical forms and methods for this. Likewise, the social sciences use logical forms and methods for studying social relationships. But this cannot serve as a basis for bringing under one logical standard the relationship of magnitude between two mountains, and the relationship of love between spouses, and the relationship of class struggle between exploiters and exploited, and for seeking a logical formula suitable for all these relationships only because they are "relationships."

Supporters of the “logic of relations” usually see the difference between “relational judgments” and ordinary judgments in that “relational judgments” express relations between objects, whereas ordinary judgments of the type “ *S* is *P* “ express only relations between concepts about objects, and not between the objects themselves. Such a distinction between judgments is absolutely incorrect.

In every judgment, concepts are connected which express objects. There cannot be true judgments which connect concepts without objects, just as there cannot be true judgments which connect objects without their concepts.

The widespread use of the “logic of relations” in bourgeois literature on logic is explained by the fact that such a construction of judgments is entirely consistent with the idealistic character of bourgeois philosophy. The logical meaning of “judgments of relation” is that they establish certain relations between objects of thought, but nothing is asserted about these objects themselves, about their existence, about their properties. In the formula *aRb*, a relation *R* between objects *a* and *b is asserted*, but it is not asserted what objects *a* and *b are*, it is not even asserted whether these objects exist in reality. “Judgments of relation” are subjectless judgments, i.e. judgments without a subject, therefore they say nothing, do not assert or deny anything about the objects of reality themselves, about their properties. Thus, this theory has an idealistic, agnostic character: judgments contain statements about the relations between thought objects, but they say nothing about the essence of these objects. As for the above-mentioned elementary and well-known examples

("Elbrus is higher than Mont Blanc," etc.), it should be recognized that the meaning of the "logic of relations," of course, is not in them; they are given only as an illustration, but in detaching judgments from objective reality that exists outside the consciousness of people and is reflected in this consciousness.

Unfortunately, in the Soviet literature on logic one sometimes encounters uncritical borrowing from the bourgeois "logic of relations", which is sometimes characterized as a progressive trend in science with a materialistic basis, as a valuable scientific achievement. Such, for example, are the views of Professor V. F. Asmus, expressed in his book "Logic" (Gospolitizdat, 1947, pp. 73, 74) and especially in the introductory article to the Russian translation of the book by the French logician Charles Serrus "An Attempt to Study the Meaning of Logic" (State Publishing House of Foreign Literature, 1943); such are also the views of P. V. Tavants in his article "On the Structure of Judgment in Attributive Logic and in the Logic of Relations" (Izvestiya of the USSR Academy of Sciences. Series of History and Philosophy , Vol. III, No. 6, 1946).

In reality, the "logic of relations" should be characterized as a reactionary trend in bourgeois logic.

Thus, we come to the conclusion that judgments considered from the formal-logical side are always judgments that connect the concepts of the subject and the predicate by their volume and by their content, and are expressed by the formula " *S* is (is not) *P* ".

§ 5. TYPES OF JUDGMENTS

In a judgment, the subject and predicate are connected by volume and content. Depending on the volume and content of the subject and predicate and the nature of their connection, judgments can be divided into the following groups:

1. *According to quantity* (volume), judgments are divided into general, particular and individual (single).
2. *According to quality* (content), judgments are divided into affirmative and negative.
3. *By character The connections between the subject and predicate* of a judgment are divided into categorical, hypothetical (conditional) and disjunctive.
4. According to the degree of importance for the subject of the feature expressed by the predicate (modality), judgments are divided into problematic, assertoric and apodictic.

Let us consider each such division of judgments.

§ 6. DIVISION OF JUDGMENTS BY QUANTITY (VOLUME)

In a judgment, the predicate may refer to the entire volume of the subject, i.e. to all objects that fit the concept of the subject, or only to a part of the volume of the subject, i.e. to some objects that fit the concept of the subject. The designation of the volume of the subject to which the predicate refers is called the quantity of the judgment. According to quantity, judgments are divided into general, particular and individual (single).

A general judgment is one in which the predicate refers to the entire volume of the subject, i.e. to all objects covered by the subject. For example, “all citizens of the USSR are obliged to observe Soviet laws” is a general judgment, since the predicate (the obligation to observe laws) refers to all citizens of the USSR, to the entire volume of the concept “citizens of the USSR”.

The same general judgment can also be in the form of negation, when the predicate denies something in relation to the entire volume of the subject. For example, “no metal is transparent” is a general judgment, since the predicate denies the feature of transparency in all metals, in each of them. “No crime should remain unpunished” is also a general judgment, since the admissibility of impunity is denied in relation to all crimes.

The formula for general judgment is as follows:

All *S* are *P*

Negative form of general judgment:

No *S* is *P*

A particular judgment is a judgment in which the predicate refers only to a part of the subject, i.e. not to all, but only to some objects covered by the concept of the subject. For example, “some students are athletes.” Here the predicate refers not to the entire scope of the subject concept, but only to a part of its scope, i.e. not to all students, but only to some. “Many students are excellent students." This is also a particular judgment, because the predicate—a sign of excellent academic performance—does not refer to the entire scope of the subject concept, not to all students, but to a part of the subject, i.e. to some students.

The same thing happens when the predicate negates something in the subject. For example, "some birds don't fly." Here the predicate does not refer to the entire volume of the subject, but only to a part of it, not to all the birds, but only to some of them.

Formula of particular judgment:

Some *S* are (or are not) *P*

The quantitative relationship of the subject and predicate in a particular judgment may be different. The predicate may relate to the greater part of the subject, just as the predicate may relate to the most insignificant part of the subject. But whenever the predicate does not relate to the entire subject, we have a particular judgment. For example, "almost all students study successfully." This particular judgment "Almost all students" means, however, not all students, but only some, albeit a large part of them.

An individual, or singular, judgment is a judgment in which the subject is an individual (single) concept, i.e. a judgment in which the subject expresses one specific object to which the predicate refers.

In other words, in individual (single) judgments the predicate refers only to one specific, individual object.

For example, "May Day is a holiday for workers all over the world," "Tchaikovsky wrote the opera "Eugene Onegin," or in the negative form: "Marconi is not the inventor of radio."

When considering judgments by their number, it should be borne in mind that the grammatical form of a judgment, i.e. a sentence, often does not indicate to which judgments—general, particular, or individual—a given judgment pertains, and this should be inferred from the meaning of the judgment itself. For example, "a just war is not a war of conquest, but a war of liberation, whose goal is to protect the people from external attack and attempts at enslavement, or to liberate the people from the slavery of capitalism, or to liberate colonies and dependent countries from the oppression of imperialists." This is a general judgment, since it speaks of all just wars, although the grammatical subject is singular.

§ 7. DIVISION OF JUDGMENTS BY QUALITY (CONTENT)

In a judgment, the predicate asserts something about the subject or, conversely, denies something about the subject. The property of a judgment, which consists in the fact that in a judgment something is asserted or denied in relation to the subject, is called the quality of the judgment in logic.

According to their quality, judgments are divided into affirmative and negative. *An affirmative judgment is one in which the predicate indicates the presence of a certain feature in the subject and in which the volume of the subject is included in the volume of the predicate*. In other words, in an affirmative judgment something is asserted about the subject. For example, "the teachings of Lenin and Stalin are invincible", "Labour in the USSR is the duty and a matter of honour of every citizen capable of labour according to the principle: “he who does not work, neither shall he eat” (Constitution of the USSR, Article 12), “the Soviet intelligentsia actively and creatively participates in the construction of communism”.

These are all affirmative judgments. The formula for an affirmative judgment is as follows:

S is *P*

When we assert something, indicate that it is, or was, or will be, or should be, or generally assert any position, we do this in the form of an affirmative judgment.

A negative judgment is a judgment in which the predicate denies the subject some feature and in which the scope of the subject is excluded from the scope of the predicate. For example, “idealism is not a scientific worldview”, “Soviet people do not want war”, “land assigned to a collective farm forever cannot be taken away from it”, “nothing can stop the progressive movement towards communism”. The formula for a negative judgment is as follows:

S is not *P*

When we deny something, indicate that it does not exist, or was not, or will not exist, or should not exist, generally deny any position, any thought, we do this in the form of a negative judgment.

§ 8. CONNECTION OF DIVISIONS OF JUDGMENTS BY QUANTITY AND BY QUALITY

Combining the divisions of judgments by quantity and quality, we obtain four types of judgments, namely: 1) general affirmative, 2) general negative, 3) particular affirmative, 4) particular negative.

General affirmative judgments are judgments that are both general and affirmative. They are expressed by the following formula:

All *S* are P

For example, "all sciences are useful", "the development of society depends on the development of productive forces and production relations", "village councils play a huge role in implementing the line of the party and government in the village"—all these are generally affirmative judgments.

General negative judgments are judgments that are both general and negative. They are expressed in the formula:

No *S* is *P*

"Nobody is in a state of absolute rest", "no living creature can exist without food and air"—these are generally negative judgments.

Thus, general affirmative and general negative judgments are characterized by the fact that in them the subject is taken in its entirety and the predicate affirms or denies something in relation to all objects covered by the concept of the subject.

Particular affirmative judgments are judgments that are both particular and affirmative. They are expressed by the formula:

Some *S* are P

For example, “after the defeat of Nazi Germany, some European countries embarked on the path of building socialism”; “with the onset of cold weather, some birds fly away to southern countries”—these are particular affirmative judgments.

Particular negative judgments are judgments that are both particular and negative. They are expressed by the formula:

Some *S* are not *P*

For example, “some trees do not lose their green attire in winter”, “some people do not cope with their work”—these are particular negative judgments.

Thus, particular affirmative and particular negative judgments are characterized by the fact that the subject is not taken in its entirety and the predicate affirms or denies something in relation to not all, but only some objects covered by the concept of the subject.

For all these four types of judgments, abbreviated notations are used in logic.

General affirmative judgments “all *S* are *P*” are designated by the letter *A* (the first vowel of the Latin word Affirmo – I affirm).

General negative judgments “no *S* is *P*” are designated by the letter *E* (the first vowel in the Latin word Nego — I deny).

Particular affirmative judgments “some *S* are *P*” are designated by the letter *I* (the second vowel in the word Affirmo).

Particular negative judgments “some ***S* are not** *P*” are represented by the letter *O* (the second vowel in the word Nego).

Thus, dividing judgments by quality and quantity and combining both these divisions, we obtain judgments of four types:

A — universal affirmative : all *S* are *P*.

E — universal negative: no *S* is *P*.

I — particular affirmative: some *S* are P.

O — particular negative: some *S* are not P.

In this classification of judgments, individual judgments are considered as general judgments, **i.e.,** respectively, as generally affirmative (*A*) and generally negative (*E*). In individual judgments, as in general judgments, the predicate refers to the entire volume of the subject, consisting of only one object. It may seem that individual judgments are similar to particular judgments, since in them the predicate does not refer to all objects of a given type, but only to one object. But this is incorrect. In their logical structure, individual judgments coincide with general judgments: in individual judgments, the predicate refers not to a part of the volume of the subject, as in particular judgments, but to the entire volume of the subject, as in general judgments, but this volume consists of only one object.

Therefore, an individual affirmative judgment, for example, “N. V. Gogol is a great Russian writer,” is designated by the letter *A* as a general affirmative; an individual negative judgment, for example, “Ludwig Feuerbach was not a materialist in his understanding of social phenomena," is designated by the letter *E* as a general negative.

§ 9. DIVISION OF JUDGMENTS BY THE NATURE OF THE CONNECTION BETWEEN THE SUBJECT AND THE PRECEDENT

According to the nature of the connection between the subject and the predicate, judgments are divided into categorical, hypothetical and disjunctive.

A categorical judgment is a judgment in which the connection between the subject and the predicate is established in an unconditional form.

"The Union of Soviet Socialist Republics is a socialist state of workers and peasants", "the economic basis of the USSR is the socialist economic system and socialist ownership of the instruments and means of production", "people are thinking beings", "the universe has no boundaries" — these are all categorical judgments, because they establish a connection between the subject and the predicate in an unconditional form. Categorical judgments can be both affirmative and negative judgments, provided that the affirmation or denial has a categorical, i.e. unconditional, character. If we affirm or deny something unconditionally, we do so in the form of a categorical judgment.

All the examples of judgments given so far in this book refer to categorical judgments.

Formula of categorical judgment:

$$S \text{ is } P$$

S is not P

The significance of categorical judgments is that, if they are true, they precisely express objective reality; it is in the form of categorical judgments that we express the knowledge we have gained about the objects and phenomena of reality, about the laws of nature and society.

A hypothetical (or, otherwise, conditional) judgment is a judgment in which the connection between the subject and the predicate is made dependent on some condition. Examples of a hypothetical judgment: "if we light the stove, the room will be warmer", "if iron is subjected to friction, it will heat up". As we can see, a hypothetical (conditional) judgment is a complex judgment, it consists of two judgments: the first judgment establishes the condition under which the second judgment will be correct. The first judgment, establishing the condition, is called *the basis* ; the second judgment, following from the first, is called the consequence. We already talked about this when we considered the law of sufficient reason (Chapter II, § 5).

The formula for a hypothetical judgment is as follows:

If S is P , then S_1 is P_1
If A is B , then C is D

Hypothetical judgments are judgments that are very often used both in ordinary speech and in science, in all cases when we affirm or deny something depending on some circumstance or condition.

The significance of hypothetical judgments is that they produce a connection of thoughts which, if the judgment is true, expresses a connection of phenomena of reality. But the affirmation or denial of something about an object, a phenomenon of reality in these judgments is made dependent on the presence of some condition, so that the affirmation or denial itself can be expressed categorically only when this condition is present.

A disjunctive judgment is a judgment that contains several predicates, of which only one can relate to the subject, or several subjects, of which only one can be related to the predicate. Examples of a disjunctive judgment: “we will either go out of town today or stay at home”, “the student will either pass the exam or fail it”.

The formulas of disjunctive judgment are as follows:

$$S \text{ is either } P \text{ or } P_1$$
$$S \text{ or } S_1 \text{ is } P$$

In the first formula there is one subject and two predicates, and the subject cannot be related to both predicates, but only to one of them. In the second formula there are two subjects and one predicate; but this predicate cannot be related to both subjects, but only to one of them. The disjunctive judgment itself does not give us an answer to the question of which predicate is related to a given subject or to which subject the predicate is related; it only establishes a choice between possible solutions to the question, and which of them is correct depends on the essence of the question under consideration, on the correspondence of one or another solution to objective reality.

In the examples given, as well as in the above formulas of disjunctive judgment, two possible solutions to the question are given, but there may be more such possible solutions in disjunctive judgments—three, four, etc. If a disjunctive judgment consists of two members, each of them is called an alternative. "*S* is either *P* or P_1"; the alternatives here are both possible, but mutually exclusive solutions: "*S* is *P*" and "*S* is P_1". In the disjunctive judgment "*S* or S_1 is *P*" the alternatives are: "*S* is *P*" and "S_1 is *P* ". The word "alternative" itself means one of two possible solutions.

Disjunctive judgments do not provide a solution to the question about which the thought is expressed; they establish a range of possible solutions, of which only one can be true, and all the rest are false.

In the division of judgments into categorical, hypothetical (conditional) and disjunctive, the last group of judgments—disjunctive—is distinguished from the first two groups very clearly and definitely by their logical structure—several subjects or several predicates. With regard to the difference between categorical and hypothetical judgments, it should be noted that any hypothetical judgment can be expressed in the form of a categorical judgment. To transform a hypothetical judgment into a categorical one, one should only include the condition (basis) in the concept of the subject or predicate. For example, the hypothetical judgment "if metal is subjected to friction, it will heat up" can be expressed as follows: "metal subjected to friction heats up"; in this case, the condition is included in the subject. The hypothetical judgment "if the weather is fine tomorrow, I will go for a walk" can be expressed as follows: "I will go for a walk tomorrow in fine weather"; here the condition is included in the predicate. Therefore, the distinction between categorical and hypothetical judgments is made according to their meaning, depending on which judgment best expresses a given thought, and not depending on the grammatical form of the sentence expressing a particular judgment.

§ 10. DIVISION OF JUDGMENTS BY THE DEGREE OF ESSENTIALITY FOR THE SUBJECT OF THE FEATURE WHICH IS EXPRESSED BY THE PRECEDENT

Depending on how essential the feature expressed by the predicate is for the subject, judgments are divided into problematic, assertoric and apodictic. This division is also called the division of judgments by modality. Let us consider each of these judgments.

A problematic judgment is a judgment that expresses the probability or possibility of the presence or absence of a feature expressed by the predicate in the subject. The presence of this feature in the subject is not established, but it is possible, probable. It is probably not known that *S* is *P*, but *S* may be *P*. Examples of a problematic judgment: “probably, the planet Mars is inhabited by living beings”, “it is possible that it will not rain today”.

These examples express the probability, the possibility of something, but do not assert that this is exactly how it is in reality.

The formulas of problematic judgment are as follows:

S can be *S*
S may not be *P*

An assertoric judgment is a judgment in which the presence or absence of a feature in the subject, expressed by the predicate, is determined as existing in reality.

"It rained yesterday," "books are printed in printing houses," "the school year begins on the first of September"—these are all assertoric judgments.

Thus, an assertoric judgment contains a statement about what is and what is not; it describes the actual state of affairs, sets out the actual circumstances of some case. The formulas of an assertoric judgment are:

S is *P*
S is not *P*

An apodictic judgment is a judgment in which the presence or absence of the subject is necessary for what is expressed by the predicate, is defined as necessary.

Examples of apodictic judgments: "two plus two equals four", "the shortest distance between two points is a straight line", "the development of society depends on the development of productive forces and production relations", "the universe has no boundaries", "science is incompatible with religion".

Formulas of apodictic judgment:

S must be *P*
S cannot be *P*

Thus, we see that in problematic judgments the attribute expressed by the predicate is the least essential for the subject: *S* can only be *P*; *S* is probably *P* , but in reality the opposite may also turn out to be true, i.e., that *S* is not *P*. In a problematic judgment, only probability is expressed. In an assertoric judgment, the attribute of the predicate is more essential for the subject: *S* is P or *S* is not *P* ; here it is definitely stated about *S* that it is (or is not) *P* , it is asserted that this is so in reality. In an apodictic judgment, the attribute of the predicate is most essential for the subject: *S* is necessarily *P,* without *P* there cannot be *S;* or S *cannot* be P, therefore it is completely excluded that *S* is *P*.

The distinction between problematic, assertoric and apodictic judgments can be made according to their meaning, but not necessarily according to their grammatical expression. Thus, apodictic judgments are far from always expressed by the words “it is necessary to exist”. The judgment “two times two is four” is not expressed by these words, it is formulated apparently as an assertoric restriction (two times two is four), but this is undoubtedly an apodictic judgment, since it is not simply a statement of fact, but a general and immutable rule: two times two is always four, it cannot not be four, it cannot be five or six.

If any proposition is asserted as actually existing, this is an assertoric judgment, and if it is asserted that this proposition necessarily exists, that it cannot be otherwise, then this is an apodictic judgment.

Apodeictic judgments are usually judgments that formulate the laws of nature and social development, mathematical rules, or those judgments that are based on these laws.

Thus, the difference between problematic, assertoric and apodictic judgments is rooted in the objective connections of phenomena of reality. If the connection of certain phenomena is accidental, the phenomenon may occur, but may not occur, if this or that feature is insignificant for a given object, so that a given object may have such and such a feature, or may not have it, our statement about such a phenomenon may take a problematic form: we will say that a given phenomenon will probably occur, or will probably be such and such, etc. Problematic judgments are also used when we do not have complete and reliable knowledge about certain objects, and therefore can only make hypothetical statements about them. Examples of problematic judgments: "the weather will probably be good tomorrow", "there may be life on Mars".

If the connection between the phenomena of reality has been determined, realised, if this or that object really exists, has certain characteristics or does not have them, and we know this, we express our knowledge in the form of an assertoric judgment.

If the connection of the phenomena of reality is necessary, if this is a law of nature or social development, so that certain objects not only exist, but also cannot but exist, not only possess such characteristics, but must necessarily possess them and cannot exist without them, we express this knowledge in an apodictic judgment. In the form of an apodictic judgment, immutable rules and orders of legal laws are also expressed, for example, "Every citizen of the USSR is obliged to observe the Constitution of the Union of Soviet Socialist Republics, to obey the laws, to observe labour discipline, to honestly perform public duty, to respect the rules of socialist community life" (Constitution of the USSR, Article 130).

It should be borne in mind that the problematic, assertoric or apodictic form of a judgment does not in itself predetermine its truth or falsity. It is possible that one or another apodictic judgment will be false precisely because of its apodicticity, its immutability, and if it were expressed more carefully, as a problematic judgment, in the form of a supposition, it would be true. The truth or falsity of these judgments, as well as of all judgments in general, depends on the correspondence or non-correspondence to the objective reality of what is expressed in them. But by their nature, the three forms of judgments under consideration differ not by an arbitrary feature of their construction, but by those objective connections of the phenomena of reality that our judgments express.

§ 11. DISTRIBUTION OF TERMS IN JUDGMENT

As we already know, according to quantity and quality all judgments are divided into four types: general affirmative, designated by the letter *A* , general negative, designated by the letter *E*, particular affirmative, designated by the letter *I*, and particular negative, designated by the letter *O*. In these judgments their terms, i.e. the subject and the predicate, can be taken either in full volume of the given concept, or in part of the volume of the concept. If in the judgment the concept of the subject or the predicate is taken in full volume, this means that its term *is distributed* . If the concept is taken only in part of its volume, this means that the term of the given concept is not distributed. This can be expressed in this way: *the term of the subject and the term of the predicate are distributed if the given concept in the judgment is taken in full volume, and not distributed. If the concept is taken in part of the volume.*

A concept (subject or predicate) that is taken in full in a judgment is distributed in a judgment, i.e. the judgment speaks of all objects covered by this concept. If a judgment speaks not of all objects covered by a given concept, but only of a part of them, the concept is considered undistributed. For example, in the judgment "all Soviet laws are subject to strict execution " the subject term is distributed, since it speaks of all laws; in the judgment "some people know foreign languages" the subject term is not distributed, since it speaks not of all people, but only of some.

Let us consider how the question of the distribution of the terms of the subject and predicate is resolved in each of the four types of judgments, distinguished by quantity and quality together— *A, E, I, O*.

1. General affirmative judgments (*A*) "all *S* are *P*". It is quite obvious that in these judgments the subject is distributed. A general affirmative judgment, as we know, is general in quantity (volume), and in any general judgment the predicate refers to the entire volume of the subject, i.e. to all objects covered by the concept that serves as the subject in the judgment. For example, "all fish live in water" — this is said about all fish, about the entire volume of the concept "fish", which means that the subject in this judgment is distributed.

It is more difficult to find out whether the predicate is distributed in universal affirmative judgments. From the formula of judgment *A itself,* “all *S* are *P,* “ it is clear that *S is distributed* , but it is not clear whether *P is distributed* . In order to answer this question, it should be borne in mind that the distribution of terms relates to the volume of the subject and predicate, therefore both the subject and the predicate must be expressed as classes of objects. Since judgment *A is* universal affirmative, i.e. both *general* and *affirmative*, the class of objects of the subject *is included* in the class of the predicate.

Let’s take an example: “all fish live in water.” Let’s construct this judgment in such a way that not only the subject, but also the predicate represents a class of objects. The class of objects of the subject is clear — “fish.” What is the class of objects of the predicate? The class of objects to which the predicate refers is “animals living in water.” This judgment will look like this: “all fish are animals living in water.” From such a formulation of the judgment, it is clear that this judgment does not speak about all animals living in water, but only about a part of them, namely, about those that are fish. The class of animals living in water includes fish, but is not limited to fish — there are other animals living in water besides fish (amphibians, cetaceans, etc.), but nothing is said about them in this judgment. Consequently, the predicate is not distributed here.

Hence the general rule: *in general affirmative judgments (A) the subject is distributed, but the predicate is not distributed.*

However, this general rule allows for one exception. There are generally affirmative judgments in which the subject and predicate have the same volume and refer to the same objects. In such judgments, not only the subject but also the predicate is distributed. Such judgments are *definitions* .

As we know, a definition is a disclosure *of the content* of a concept, i.e. a definition consists in the fact that it specifies the essential features of those objects that are covered by the defined concept, namely the feature of the closest genus and the specific feature (specific difference). Every definition is expressed by a general affirmative judgment in which the subject is the defined concept, and the predicate is the defining concept, i.e. the concept expressing the content (features) of the defined concept. Therefore, in a definition, the volumes of the subject and predicate are the same, the subject and predicate relate to the same objects, and in the subject the features of these objects are not expressed, but in the predicate these features are expressed, designated. When we indicate the closest genus in a definition, we thereby include the volume of the defined concept in the volume of the concept expressing the closest genus. This latter concept of the closest genus is not distributed. But here we indicate the species difference and thereby limit, narrow this closest genus to the volume of the concept being defined. Both the concept being defined (subject) and the defining concept (predicate) are distributed.

Let us give an example: “production relations are relations between people in the process of producing material goods.” In this judgment, the subject is distributed, since it is talking about all production relations. The closest genus for production relations is relations between people, therefore the scope of the concept of “production relations” is included in the scope of the broader concept of “relationships between people.” This latter concept is not distributed, since relations between people (social relations) also include other relations besides production relations (for example, legal relations, moral relations), about which nothing is said in this judgment. But by adding to the closest genus, i.e. relations between people, a specific distinction — "in the process of producing material goods" — the scope of the predicate is narrowed to the scope of the subject: all production relations are relations between people in the process of producing material goods, and all relations between people in the process of producing material goods are production relations.

Another example: "students—those studying at a higher educational institution." The subject is distributed, since it is talking about all students. The predicate "students at higher educational institutions" is also distributed, since all students at higher educational institutions are students, and therefore the judgment is talking about all of them.

Thus, in general affirmative judgments expressing definitions, both concepts are distributed—the subject (defined) and the predicate (defining).

2. General negative judgments (*E*) "no *S* is *P*". The question of distribution of the subject of a general negative judgment is decided in the same way as the subject of a general affirmative judgment — it is distributed. "No *S* is *P*" is the same as "all *S* are not *P*". "No metal is transparent" is the same as "all metals are opaque". The subject of a general negative judgment speaks about the entire class of objects, about the entire class of objects covered by the concept of the subject, which means that in this judgment the subject is distributed. But what about the distribution of the predicate?

Let us take the same example: “no metal is transparent”. Let us construct this judgment in such a way that the predicate also represents a class of objects: “no metal is a transparent body”. The subject here is distributed: “no metal” is the same as “all metals”. The predicate in this judgment is “transparent bodies”. Is it distributed? If we say that no metal is a transparent body, then this means that we exclude all metals from *the entire* class of transparent bodies. If no metal is a transparent body, then no transparent body is a metal. This means that this judgment speaks about the entire volume of the concept of the predicate, the volume of the subject is excluded from the entire volume of the predicate, and this means that in general negative judgments the predicate is distributed.

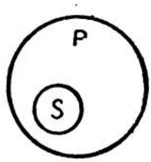
In every general negative judgment, the subject is excluded from the entire volume of the predicate: “no *S* is *P* “ means that *S* is excluded from *the entire* volume of *P*, that *S* cannot relate to any object covered by the concept of *P*. Consequently, in general negative judgments, the predicate is taken in its entirety, i.e., it is distributed.

Hence the general rule: *in general negative judgments (E) the subject and predicate are distributed.*

3. Particular affirmative judgments (*I*) “some S are P”. The subject here is clearly not distributed: the judgment does not speak about all *S* , but only about some S, not about the entire volume of the concept 3, but only about a part of its volume. The predicate is also not distributed, since general affirmative and particular affirmative judgments differ from each other not by the volume of the predicate, but by the volume of the subject: there “all *S*”, here “some *S*”. In particular affirmative judgments (*I)*, as well as in general affirmative judgments (*A*), it is not the entire volume (class) of the predicate that is spoken about, but only a part of it.

Let us give an example: “some students master logic well”. Here the subject is “some students”. The subject is not distributed, since it is not taken in its entirety, but only in part of the volume. Let us reformulate this judgment and say: “some students are persons who master logic well”. The predicate here “persons who master logic well” is not distributed, since the judgment does not speak about all persons who master logic well, but only about some of these persons, namely, those who are students, and nothing is said about the rest. Hence the rule: *in particular affirmative judgments (I), the subject and predicate are not distributed.*

There is an exception to this general rule, similar to the one with respect to universal affirmative judgments (*A*): there are particular affirmative judgments (*I*) in which the predicate is distributed. This exception is as follows. Let us take a universal affirmative judgment (A) in which the scope of the subject is included in the scope of the predicate. The relationship between the scope of the subject and the predicate can be graphically represented here as follows (see Fig. 11). *S* (the subject) is a subordinate concept in relation to *P* (the predicate). For example, “all crimes (are) socially dangerous acts”, “all pikes (are) fish”. In these judgments (A), as we know, the subject (*S*) is distributed, the predicate (*P*) is not distributed. We can reconstruct these judgments in such a way that the predicate becomes the subject, and the subject the predicate. Since the predicate in these general affirmative judgments (*A*) is not distributed, it can be put in place of the subject also undistributed, i.e. not in full, not as “all”, but as “some”. Then we get “some P are *S*” — a particular affirmative judgment (*I*). In this judgment, the subject (the previous predicate) is not distributed, as it was as a predicate in the original general affirmative judgment *(A)*, and the predicate (the previous subject) is distributed, as it was distributed as a subject in the original general affirmative judgment. Indeed, from the judgment “all crimes (are) socially dangerous acts” (A) we can make the judgment “some socially dangerous acts (are) crimes” (*I*). From the judgment “all pikes are fish” (A) we can make the judgment “some fish are pikes” (*I*). In these particular affirmative judgments the predicate is distributed, taken in its entirety: the first judgment speaks of all crimes, since there are no crimes that are not socially dangerous, and the second judgment speaks of all pikes, since there are no pikes that are not fish. As we shall see in the next chapter, the transformation of general affirmative judgments into particular affirmative judgments is called conversion through restriction. Therefore, the rule according to which the predicate is not distributed in particular affirmative judgments should be supplemented by an exception: *in particular affirmative judgments obtained by conversion through restriction of general affirmative judgments, the predicate is distributed.*



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4. Particular negative judgments (*O*) "some *S* are not P". The subject in them is obviously not distributed — we are talking about some *S*, and not about all *S*, which means not about the entire volume of the concept *S*, but only about a part of the volume of this concept. The predicate is distributed, as in general negative judgments, since a particular negative judgment differs from a general negative judgment by the volume of the subject, and not the predicate. As in a general negative judgment, in a particular negative judgment the subject is excluded from *the entire* volume of the predicate, which means the predicate is taken in its entirety and thereby distributed. Let's take an example: "some people did not study logic." For clarity of analysis, we will reformulate the judgment: "some people are not people who have studied logic." The subject "some people" is not distributed; here we are talking not about all people, but about some. The predicate is distributed, taken in its entirety, because this judgment speaks of all people who have studied logic: those who have not studied logic are not included among the people who have studied logic. Hence the rule: in *partial negatives judgments (O) the subject is not distributed, a predicate distributed*.

Thus, we have the following four rules concerning the distribution of terms in the judgments *A, E, I, O*: in general affirmative judgments, the subject is distributed, but the predicate is not distributed; in general negative judgments, *both the subject and the predicate are distributed; in particular affirmative judgments, neither the subject nor the predicate is distributed; in particular negative judgments, the* *subject is not distributed, but the predicate is distributed.*

These rules can be formulated as a single rule: the subject is distributed in general judgments and is not distributed in particular ones; the predicate *is distributed in negative judgments and is not distributed in affirmative ones.*

The exceptions are general affirmative judgments expressing definitions of a concept in which the volume of the predicate coincides with the volume of the subject and therefore the predicate is distributed, and particular affirmative judgments formed by reversal through limitation of general affirmative judgments in which the predicate is also distributed.

Chapter VIII. JUDGMENT (continued)

1. The matter of judgment. 2. Relations between judgments. 3. The logical square. 4. Relations between judgments of different matter. 5. Relations between individual judgments. 6. The logical meaning of affirmation and negation. 7. Methods of negation.

§ 1. THE MATTER OF JUDGMENT

The matter of a judgment is the concepts themselves, connected in the judgment, regardless of the nature of this connection and the volume in which these concepts are taken in the judgment. This means that in order to determine the matter of a judgment, it is necessary to abstract from the quantity of the judgment (general or particular) and from the quality of the judgment (affirmative or negative), and take only the concepts themselves, which serve as the subject and predicate in the judgment. For example, in the judgment "all metals are smeltable", the matter is the concepts "metals" and "meltable bodies". In the judgment "all metals are opaque" (no metal is a transparent body), the matter is the concepts "metal" and "transparent body". Therefore, such judgments as, for example, "all students learn logic well" and "some students learn logic well" have the same matter, since they have the same concepts as the subject and predicate, although these judgments differ in quantity — one is general, the other is particular. In the same way, the judgments "some books are interesting", "some books are not interesting" have the same matter, since they have the same subject (books) and the same predicate (interesting), although the quality of these judgments is different: one judgment is affirmative, the other is negative.

The matter of a judgment does not determine the thought expressed in the judgment, but it determines those objects and their attributes, those aspects of objective reality, to which the thought is directed and which are expressed in the judgment. In the judgment "metals are not transparent" the matter is the concepts "metal" and "transparent body". From the matter of this judgment itself it is not clear what thought we will express in the judgment — whether we will say that metals are not transparent or they are transparent, whether we will say this about all metals or only about some. But from the matter of this judgment it is clear that we are speaking about metals and about transparent bodies, that we are talking specifically about them.

In logic, the definition of the matter of a judgment is important when we compare two or more judgments with each other. In these cases, it is necessary first of all to establish whether the matter of these judgments is the same or different, i.e. whether the concepts themselves, which are the subject and predicate in them, are the same or different. If these concepts are the same, then it should be established what the difference is between these judgments themselves—in quantity (one judgment is general, the other particular) or in quality (one judgment is affirmative, the other negative), or in both together.

§ 2. RELATIONS BETWEEN JUDGMENTS

Our thoughts, expressed in various judgments, may relate to different objects, between which there is a connection or this connection is absent. If our thoughts relate to different properties of the same objects, as well as to different objects, but connected to each other by some common features, then the corresponding judgments will be connected to each other, there will be certain relations between them. In relation to each other, judgments can be: 1) identical, 2) compatible and 3) incompatible.

Identical judgments are judgments in which one term (subject or predicate) is the same, and the other is expressed in identical concepts, with the same connection between both terms.

For example, “man is a rational being” and “man is a being capable of understanding the meaning of his actions and directing them” are identical judgments, since they have the same subject, and their predicates are identical concepts (a rational being is a being that is capable of understanding the meaning of his actions and directing them).

Compatible judgments are judgments that differ in subjects, predicates, or the connection between them, if the truth of one judgment does not exclude the truth of the other, if both of them can be true.

Such compatibility of judgments can take place in two cases. 1) In one judgment something is stated with respect to one part of the scope of a concept, and in another judgment something else is stated with respect to another part of the scope of the same concept; for example, “some roses are red” and “some roses are white" are compatible. 2) In one judgment some features of some objects are indicated, and in another judgment other features of the same objects are indicated, for example, "all metals are elements" and "all metals are electrical conductors" are also compatible judgments.

Incompatible judgments are judgments that exclude each other, that cannot both be true at the same time, so that the truth of one necessarily entails the falsity of the other.

This situation occurs when something is affirmed and denied in relation to the same objects, or when mutually exclusive attributes are attributed to the same objects. For example, "mercury is a metal," "mercury is not a metal" are incompatible judgments (the first is true, the second is false).

Compatible and incompatible judgments may be distinguished according to whether they have the same matter or whether they have different matter.

Let us consider the relations between compatible and incompatible judgments of the same matter.

§ 3. LOGICAL SQUARE

As we already know, all judgments are divided into four types by quantity and quality: general affirmative— *A* , general negative— *E*, particular affirmative—/, particular negative— *O*. If we take judgments of all four types, but of the same matter, then certain constant relations can be established between them. These relations are as follows. If one such judgment is true or false, this determines the truth or falsity of other judgments of the same matter or leaves them indefinite. And since truth or falsity is a necessary property of every judgment (see Chapter VII), then the definition of such a relationship of judgments has undoubted value for our thinking, contributes to its correctness. The relations between judgments of the same matter in logic are studied with the help of a special scheme called a logical square.

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The logical square is a visual and mnemonic (serving to facilitate memorization) means for determining the relationships of individual types of judgments of the same matter from the point of view of their truth or falsity.

Let us draw a square. On its upper side, at the corners, we denote *A* and *E,* and on its lower side, at the corners, we denote *I* and *O*. Then we draw the diagonals of the square. The name of the relations between judgments will be as follows: between *A* and *E* there will be a relation *of opposition* (contrarity): *A* and *E are oppositional (contrary)* judgments ; between *I* and *O* there will be a relation *of subopposition* (subcontrarity): *I* and O are oppositional (subcontrary) judgments; between *I* and A there will be a relation of subordination, since a particular affirmative judgment is in a relation of subordination to a general affirmative judgment; the same applies between *O* and *E there will be* a relation of subordination, since a particular negative judgment is in a relation of subordination to a general negative judgment. The relations between *A* and *O*, *E* and *I* are relations of contradiction (contradictory), these are contradictory (contradictory) judgments. It turns out that each line on this square depicts some constant relationship between two types of judgments.

If one or another judgment designated in the logical square (*A, E, I, O*) is true or false, we can find out what follows from this in relation to the truth or falsity of other types of judgments.

The logical square establishes relationships only between judgments of the same matter, i.e. between judgments with identical concepts; they differ from each other only in the volume in which their terms are taken (all and some), and the connection between these terms (affirmation and negation). Consequently, in the logical square, judgments *A, E, I, O* represent variants of the connection of the same concepts. For example, *A* is “all birds are vertebrates”; then the remaining types of judgments in the logical square will be as follows: *E* is “no bird is a vertebrate”, *I* is “some birds are vertebrates”, *O* is “some birds are not vertebrates”.

Let us consider all the relationships of judgments in a logical square.

1. The relation of oppositeness. Judgment *A* (generally affirmative) and judgment *E* (generally negative) are opposite (contra) judgments.

If *A* is true, then the opposite judgment *E* will be false: “all metals are smeltable” (*A*) is true, “no metal is smeltable” (*E*) is false.

If *E* is true, then in a similar way the opposite judgment A is false: “no animal can live without food and air” (*E*) is true, “all animals can live without food and air” (*A*) is false.

This position is explained as follows. If two judgments—a universal affirmative and a universal negative—have the same matter, this means that in one judgment something is affirmed with respect to all objects of a given class, and in the other judgment the same thing is denied with respect to all objects of the same class. Of course, both of these judgments together cannot be true by virtue of the law of contradiction (see Chapter II), therefore, if one opposing judgment is true, the other will necessarily be false.

Thus, from the truth of one contrary judgment follows the falsity of another contrary judgment; both of them cannot be true at the same time.

Now let us see what conclusion can be drawn from the falsity of one judgment contrary to another.

If *A* is false, it does not necessarily follow that *E is true*; it may be either false or true. “All men have studied logic” (*A*) is a false proposition, “no man has studied logic” (E) is also a false proposition. “All men breathe through gills” (A) is a false proposition, “no man breathes through gills” (*E*) is a true proposition. Thus, the falsity of proposition *A* leaves proposition *E* *undefined*.

If *E* is false, then it does not necessarily follow that A is true; it may be either false or true. “No man has studied logic” (*E*) is false, “all men have studied logic” (*A*) is also false. “No mammal breathes with lungs” (*E*) is false, “all mammals breathe with lungs” (*A*) is true. Thus, the falsity of the judgment *E* leaves the judgment *A undefined*.

Indeed, if one contrary judgment *A* or *E* is false, it is impossible to conclude from this that the other contrary judgment is true. If judgment *A is false*, this means that all objects expressed by the concept of the subject are incorrectly ascribed the attribute expressed by the predicate. But this does not mean at all that judgment *E is true* , in which this attribute is denied to all objects of the same class. Judgment *A* may be false because a certain attribute is ascribed to all objects of a given class, whereas in reality this attribute is inherent only to some objects of this class; in this case, the contrary judgment, in which this attribute is denied to all objects of the class, will also be false.

This means that from the falsity of one opposing judgment neither the truth nor the falsity of another opposing judgment necessarily follows; the latter may be either true or false.

This relation between opposing judgments can be expressed thus: *two opposing judgments cannot both be true at the same time, but they can both be false. The truth of one opposing judgment implies the falsity of the other opposing judgment, but the falsity of one opposing judgment does not imply the truth of the other, which may be either true or false* .

When considering opposing judgments in a logical square, the following question arises. If the falsity of one opposing judgment does not imply the truth of another opposing judgment, and this second opposing judgment can be both false and true, then it remains unclear when this second judgment will be true and when false. Depending on what will this second judgment be true in some cases and false in others? This question is resolved as follows.

If the falsity of one contrary judgment lies in the fact that in this judgment the objects of the class expressed by the concept of subject, the predicates are falsely attributed with a feature that is not inherent to them, or the objects of this class are falsely denied a feature that is inherent to them, then the other contrary judgment will be true.

For example, “all mammals breathe with gills” (*A*) is a false judgment and its falsity lies in the fact that we have attributed to mammals a feature that is not characteristic of them — breathing with gills. Therefore, the opposite judgment “not a single mammal breathes with gills” (*E*) will be true.

If the falsity of one contrary judgment lies in the fact that it incorrectly attributes some characteristic to all objects of a given class without exception, whereas this characteristic is characteristic only of some of them, then the other contrary judgment will also be false.

For example, “all mountains are high” is a false judgment, and its falsity lies in the fact that height is attributed to all mountains, whereas this feature is characteristic of only some of them. Therefore, another opposite judgment will also be false: “no mountain is high” — this is also untrue.

We can say this: if the falsity of one contrary judgment lies in *the quality* (content) of the judgment, expressed by the conjunction (is, is not), then the other contrary judgment will be true; if the falsity of one contrary judgment lies in *the quantity* (volume) of the judgment (all, none), the second contrary judgment will also be false.

We see that the relationship between opposing judgments is based on the law of contradiction, according to which two contradictory thoughts cannot be true; one of them will necessarily be false.

2. The relation of subordination. The relation of subordination in the logical square exists between judgments *I* and *A*, as well as between *O* and *E*. The general affirmative judgment *A* is subordinating in relation to the particular affirmative judgment *I* , which is subordinate in relation to *A*. In the same way, the general negative judgment *E* is subordinating, and the particular negative *O* is subordinate.

If the subordinate judgment (A or E) is true, then the judgment subordinate to it (respectively 1 and O) will also be true.

If it is true that "all *S* are *P*", then it is also true that "some *S* are *P*". If it is true that "no *S* is *P*", it is also true that "some *S* are not *P*". For example, "all metals conduct electricity" is true, which means it is true that "some metals (e.g. iron, platinum, etc.) conduct electricity". The same: "no plant can exist without air" (*E*) is true, which means it is also true that "some plants (anthers, gymnosperms, etc.) cannot exist without air" (*O*).

This rule is explained as follows. If the subordinate judgment is true, it means that a certain attribute is correctly attributed to all objects. But if all objects of a given class have this attribute, it means that any part of the objects of a given class also has this attribute, i.e. the subordinate judgment *I is also true*. In judgment *A*, something is correctly stated about the entire volume of the subject concept, which means that in judgment *I*, the same is correctly stated about a part of the volume of this same concept. The same is true with respect to judgments *E* and *O*.

If the subordinate proposition (I or O) is true, then this does not entail the truth of the corresponding subordinate proposition (A or E), which may be either true or false.

"Some books are interesting" (*I*) is true, "all books are interesting" (*A*) is false.

"Some people have not studied logic" (*O*) is true, but the subordinating proposition "no person has studied logic" (*E*) is false.

Indeed, if in a particular affirmative judgment something is correctly asserted with respect to some objects of a given class, part of the volume of a given concept, this does not mean that the same assertion will be correct with respect to the entire volume of a given concept, all objects of this class: part of the volume of a concept may have some feature, therefore the judgment is true, but other objects of the same class do not have this feature, therefore judgment A will be false. The same applies to judgments *O* and E (particular negative and general negative).

If the subordinate proposition (A or E) is false, it does not follow that the subordinate proposition (I or O) is false; it may be either true or false.

For example, the proposition "all books are interesting" (*A*) is false, but the proposition subordinate to it "some books are interesting" (*I*) is true. Another proposition — "no metal is a simple body" (*E*) — is false, the subordinate proposition "some metals are not simple bodies" (*O*) — is also false. Therefore, from the falsity of the subordinate proposition one cannot draw any conclusion regarding the falsity or truth of the subordinate proposition.

The explanation of this rule follows from the above. The general affirmative judgment A is false, i.e. some attribute is incorrectly attributed to all objects of the given class. But this does not mean that this attribute does not belong to some objects of this class, therefore it cannot be asserted that the particular affirmative judgment *I is also false.*

So, if the subordinating proposition is false, the subordinate proposition may be either true or false. The question of in which cases, when the subordinating proposition is false, the subordinate proposition will be true, and in which cases it will be false, is decided as follows.

If the falsity of the subordinate proposition lies in its incorrect quantity, the subordinate proposition will be true. "No *S* is *P*" (*E*) is false, and its falsity consists in the statement that "no *S* is *P*" when in fact there are *S* that can be *P*; in this case the subordinate proposition O "some *S* are not *P*" will be true. But if the falsity of the subordinate proposition lies in its incorrect quality, i.e. in the fact that an attribute *P incompatible with it is incorrectly ascribed to S*, or an attribute *P* necessarily belonging to *S is denied*, then the subordinate proposition will also be false. "No *S* is *P*" is false, and its falsity consists in the fact that we say that "no *S* is *P*" when in fact every *S* has the attribute *P ; in this case the subordinate proposition "some S* are not *P" will* also be false. The same can be shown in the relations of *A* and *I*, i.e., of general affirmative and particular affirmative judgments. For example, the judgment "all books are interesting" is false, and its falsity lies in the fact that we attribute this feature to all books without exception; in this case, the subordinate judgment "some books are interesting" will be true.

Now let us take the following proposition: "all metals are complex bodies" (*A*); this proposition is false because the attribute of a complex body is falsely attributed to metals, whereas metals are simple bodies; consequently, the proposition that "some metals are simple bodies" (*I*) will also be false.

If the subordinate proposition is false, then the subordinate proposition will also be false.

"Some metals are complex bodies" (*I*); this is false, and even more false is "all metals are complex bodies" (*A*). This rule is quite clear: if some objects of a given class lack some feature, it cannot be asserted that all objects of the same class have this feature. If it is false that part of the volume of a concept has a given feature, even more false is it that the entire volume of the same concept has this feature.

In order to understand the relationship between subordinating and subordinate judgments in the logical square, it is necessary to know what meaning in formal logic is put into the expression "some" itself, which defines particular judgments by quantity — "some *S* are *P*" (*I*), "some *S* are not *P*" (*O*). The word "some" can have different meanings. "Some" can mean "some part" of some objects about which we say something, without saying anything about all the other objects of the same class. In this sense, I can say that some metals are smelting, having in mind a certain part of the metals known to me or of interest to me (iron, gold), and completely leaving aside all the other metals, about which I say nothing, whether they are also smelting or not. This is precisely how the word "some" is understood in particular judgments (*I* and *O*), as they are used in the logical square. Therefore, if it is true that "all S are *P*", then it is true that "some *S* are *P*", i.e. some part of the objects designated by *S*. If it is true that all metals are smeltable, then it is also true that some metals, which interest me now, are also smeltable (iron, gold). But along with this understanding, the expression "some" can be given another meaning: "some" can be understood as "only some", "not all" (we usually understand it this way in colloquial speech). Therefore, if I say that some students passed their exams with flying colours, then I am thereby saying that the other students received different, lower marks. If I say that during my illness some of my comrades visited me, then I mean that not all of my comrades visited me, but only some of them, while the rest did not.

In considering the above rules of the logical square, the word "some" cannot be understood in the latter sense. Indeed, if I say that all metals are smeltable, then the statement "some metals are smeltable" in this sense will be incorrect, since it will mean that only some metals are smeltable, and the rest are not smeltable. Therefore, "some" in logic means a part of the objects referred to in the judgment, without implying anything about the rest of the objects of the same class.

3. The relation of contradiction. The relation of contradiction includes judgments connected by the diagonals of a logical square — *A* and *O* , *E* and *I*. A general affirmative judgment (*A*) and a particular negative judgment (*O*), as well as a general negative judgment (*E*) and a particular affirmative judgment (*I*) are contradictory judgments.

The relations between contradictory judgments are as follows: *both contradictory judgments together cannot be true and cannot be false, one of them is* *always true, the other is false. In other words: if one contradictory judgment is false, then the other is true, and vice versa, if one is true, then the other is false*. If *A* is true, then *O* is false; if A is false, then *O* is true; if *E* is true, then *I is false; if E* is false, then *I* is true; if O is true, then A is false; if *O* is false, then *A is* true; if *I* is true, then E is false; if *I* is false, then *E* is true. "All metals conduct electricity" (*A*) is true, therefore the judgment "some metals do not conduct electricity" (*O*) is false. "Some fish breathe through lungs" (*I*) is false, therefore "no fish breathe through lungs" (*E*) is true, etc.

Thus, the relationship of contradictory judgments is based on the law of the excluded middle, according to which if one thought contains a denial of what is asserted in another thought, then one thought will always be true and the other false (tertium non datur—there is no third).

4. The relation of sub-opposition. The relation of sub-opposition (sub-contrarity) exists between judgments located on the lower side of the logical square— *I* and *O* , i.e. between a particular affirmative judgment and a particular negative judgment. The dependence of the falsity and truth of one sub-contrary judgment on the truth and falsity of another sub-contrary judgment can be established in the following way.

If *I* (a particular affirmative proposition) is true, then the proposition *E* (a general negative proposition) that contradicts it is false. But from the falsity *of E* , as we know, does not follow the falsity of O, which may be either true or false. Likewise, if *O* (a particular negative proposition) is true, then *A* (a general affirmative proposition) that contradicts it is false, and from the falsity of *A* does not follow the falsity of *I subordinate to it* . Hence the rule: *from the truth of one contrary proposition does not follow the falsity of another contrary proposition, which may be either true or false; both contrary propositions may be true.*

For example, “some plants have stems and leaves” is a correct particular affirmative judgment. “Some plants do not have stems and leaves” is also a correct particular negative judgment. Another example: “some people speak foreign languages” is a particular affirmative judgment; it is correct. “Some people do not speak foreign languages” is a particular negative judgment; it will also be correct. Therefore, the truth of one contrary judgment allows the truth of another contrary judgment. Two contrary judgments, i.e. a particular affirmative and a particular negative, can both be true; they are entirely compatible if they refer to different parts of the volume of the same concept, which is the subject in them.

If *I* is false, what will *O be*? If I is false, then its contradictory *E* will be true, and if *E is true*, then its subordinate *O will be true*. If *O* is false, its contradictory *A will be true*, and if *A is true*, then its subordinate *I will also be true*.

The particular affirmative judgment “some living beings can live without oxygen” is false. If it is false, then, as we know, the general negative judgment *E, which contradicts it* , “no living being can live without oxygen,” is true, just as the judgment *O , subordinate to it*, “some living beings cannot live without oxygen,” is true. Thus, if *I is false*, *O is true*, and if O is false, *I is true* .

Therefore, *if one contrary judgment is false, then the other contrary judgment is true*, *both contrary* *judgments cannot be false, one of them is necessarily true.*

To remember all the rules better, you can repeat them in this way: you should take each judgment in the logical square and find out what follows for all other judgments from its truth and its falsity. Then, going clockwise, we get the following:

If *A* is true, then *E* is false, *O* is false, *I* is true.

If *A* is false, then *E* is indefinite (may be true, may be false), *O* is true, *I* is indefinite.

If *E* is true, then *O* is true, *I* is false, *A* is false.

If *E* is false, then O is indefinite, *I* is true, *A* is indefinite.

If *O* is true, then *I* is indefinite, *A* is false, *E* is indefinite.

If *O* is false, then *I* is true, *A* is true, *E* is false.

If *I* is true, then *A* is indefinite, *E* is false, *O* is indefinite.

If *I* is false, then *A* is false, *E* is true, *O* is true.

§ 4. RELATIONS BETWEEN JUDGMENTS OF VARIOUS MATTER

Judgments of different matter are judgments in which the subjects and predicates are different concepts. The relationships between such judgments may be different: some relate to different objects, others relate to different features of the same objects. Some judgments of different matter may be compatible with each other, while others are incompatible. Judgments are compatible if the truth of one judgment does not exclude the truth of another; judgments are incompatible if the truth of one judgment necessarily means the falsity of the other.

We will consider the relationships of judgments of different matter, in which the subjects are one and the same concept, and the predicates are concepts of different content, subordinate to a broader, generic concept.

To do this, we turn to the logical square, which, as we know, indicates relationships only between judgments of the same matter, and we will give the negative judgments *E* and *O* the appearance of affirmative judgments. This can be done in the following way.

The general negative judgment E "no S is *P* " can be expressed as follows: "all *S* are not- *P* ". For example, "no violation of the law is an act that can be justified" (*E*); "every violation of the law is an act that cannot be justified" (*A*). The same can be done with respect to the particular negative judgment *O* : "some *S* are not *P* "(*O*) can be expressed as follows: "some *S* are not- *P* "(*/*). For example, "some civil law transactions are not acts requiring written form" (*O*) — "some civil law transactions are acts that do not require written form" (*/*). Such a change in the quality of a judgment is called transformation, which we will discuss in the next chapter.

The concept of not- *P* , which is the predicate of this transformed judgment, is a contradictory concept in relation to *P* . It includes all concepts that belong to the same series as *P* , but are not P . For example, if *P* is white objects, then not- *P* are objects of all other colours — blue, red, etc., including the opposite concept in relation to white — black. The relationship of contradictory concepts can be graphically represented as follows:

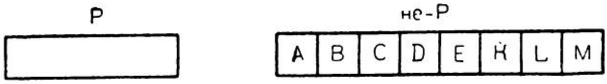

Рис. 13

From this it follows that if the proposition “all *S* are *P*” is true, then the propositions “all *S* are not- *P* “ and “some *S* are not- *P*” are false, and therefore all such propositions in which the predicate is any concept included in not- *P* , i.e. incompatible with *P* , *are also false*. Therefore, if it is true that “all *S* are *P*”, then the propositions “all *S* are *A* “, “all *S* are *B* “, etc., as well as “some *S* are *A*”, “some *S* are *B*”, etc., will be false. For example, “all banknotes are issued by the state” is true, which means that “all or some banknotes are issued by public organizations, or private individuals, or their associations” is false.

On the contrary, if a general affirmative or particular affirmative judgment is true, in which the predicate is any concept included in non- *P* (*A, B, C, B* , etc.), then the general affirmative judgment “all ***S*** are *P*” will be false. For example, “some roses are red” is true; therefore, it is false that “all roses are white”, “all roses are yellow”, etc. “Some roses are white” is true, therefore, it is false that “all roses are red”.

However, from the falsity of a general affirmative or particular affirmative judgment in which the predicate is any concept included in the concept not-P, one cannot in any way draw a conclusion about the truth of a judgment in which the predicate is *P* , just as from the falsity of a judgment in which the predicate is P, one cannot in any way draw a conclusion about the truth of a judgment in which the predicate is a concept included in not-*P*. For example, the judgment “all roses are white” is false, but the truth of a judgment about any other colour of roses (for example, yellow, red, etc.) does not follow from it.

This relationship between judgments of different matter is of great importance in our everyday thinking. If different attributes are ascribed to the same objects in two judgments, it is important for us to know whether these judgments are compatible, i.e. whether they can both be true or whether the truth of one necessarily entails the falsity of the other. To do this, we will designate the attribute ascribed to these objects in one judgment as P (the predicate) and see whether the other attribute ascribed to the same objects in the other judgment is not—*P*, i.e. incompatible with *P* , which is part of a concept contradictory to *P*. If this second attribute pertains to not- *P* , both judgments cannot be true, one of them is necessarily false, and if we know that the first judgment is true, the second is necessarily false! Incompatible judgments of the same matter (in a logical square) are always an affirmation and a negation. Incompatible judgments of different matters are two affirmations. In our thinking, two assertions are more often opposed to each other than an assertion of something and a simple denial of the same thing. In the above way, we can establish the incompatibility of these assertions, from which it follows that if one assertion is true, then the other is false.

§ 5. RELATIONS BETWEEN INDIVIDUAL JUDGMENTS

Individual judgments, like general and particular judgments, can be identical, compatible, and incompatible. Identical judgments are judgments in which their subjects or their predicates, or both together, are identical concepts. For example, "Maxim Gorky is the founder of proletarian socialist literature," "the author of the story "Mother" is the founder of proletarian socialist literature" are identical judgments.

Compatible individual judgments are those individual judgments of which the truth of one does not exclude the truth of the other; such judgments may concern different objects or different features of the same object. For example, "Moscow is the capital of our homeland", "Moscow was founded in 1147".

Among incompatible individual judgments, judgments that deserve special attention are: a) contradictory and b) *opposite*.

Contradictory individual judgments are those judgments of which one denies what the other asserts, without making any other assertion. We can say otherwise: contradictory judgments are judgments of which one asserts something, and the other denies the very thing that the first asserts regarding the same subject.

As we know, according to the excluded middle, between the affirmation of any thought and its negation there is no third, no middle ground; one of them, that is, the affirmation or the negation, is true, and the other is false. Contradictory judgments are those of which one expresses the affirmation of any thought, and the other its negation. Therefore, of two contradictory judgments, one will be true, and the other false.

Examples of contradictory judgments: “this table is wooden”, “this table is not wooden”; “this person is smart”, “this person is not smart”; “logic is a science”, “logic is not a science”, etc.

Thus, two contradictory judgments cannot both be true and cannot both be false; one of them is always true and the other is always false.

When we have two individual contradictory judgments, one of them is an affirmative judgment, since it affirms a given thought, and the other is a negative judgment, since it denies the same thought.

The relationships between contradictory individual judgments are the same as between contradictory judgments in a logical square (*A—O, E—I*), but since here we are talking about individual, singular judgments in which the subject is an individual concept related to a separate, singular object, then in these judgments there is no difference in quantity (general and particular judgment), which is characteristic of contradictory judgments in a logical square.

Opposite individual judgments are those judgments of which one judgment not only denies the other, but asserts the opposite of what the first asserts. For example, “Ivanov is a good man” is one judgment, “Ivanov is an evil man” is another judgment; the latter judgment is the opposite of the first, because it not only denies the first, but also asserts the opposite, i.e., that Ivanov is not only not a good man, but, on the contrary, Ivanov is an evil man.

“This paper is white”, “this paper is black”; “this water is cold”, “this water is hot”—these are opposite judgments.

We know that according to the law of contradiction, two incompatible thoughts cannot be expressed about the same object at the same time and in the same sense and relation; two mutually exclusive characteristics cannot be attributed to the same object.

Therefore, two individual opposite judgments cannot both be true, one of them will necessarily be false. “This man is good”, “this man is bad” — these are opposite judgments, both of them cannot be true, one of them is false: if it is true that this man is good, then it is not true that he is bad; if it is true that he is bad, then it is not true that he is good.

Let us recall that the law of contradiction applies only to those cases where incompatible attributes are attributed to the same object, *at the same time and in the same sense, relation*. If we say that this person is generally good, but in such and such a case he acted badly, then these judgments will not be opposite, the law of contradiction is not applicable to them, and both of them can be true.

Thus, the law of contradiction applies to the relations of individual opposite judgments. *But the law of the excluded middle does not apply to the relations of individual opposite judgments*. If one of two contradictory judgments is true and the other is false, then both of the two opposite judgments may be false, and some third judgment will be true. Therefore, if there are no intermediate steps between two contradictory judgments, then there may be intermediate steps between two opposite judgments.

For example, “this paper is white”, “this paper is black”—both of these judgments cannot be true, but both of them can be false, since this paper may not be white or black, but some other colour, for example brown, blue, green, etc.

The relations between individual opposite judgments are the same as between opposite judgments in a logical square (*A* and *E*), but the difference is as follows: 1) opposite judgments in a logical square are general, but here we are talking about individual judgments; 2) of two opposite judgments, one is always affirmative and the other negative, while opposite individual judgments are both affirmative.

The relationship of opposite judgments is also applicable to judgments, one of which has as its predicate any concept included in the concept that is contradictory in relation to the predicate of the first judgment (see § 4).

"This ***S*** is *P* ", "this *S* is not *P*" are contradictory judgments. The second judgment can be expressed: "this ***S*** is not- *P*"; not—*P* , as we have already indicated above, includes various concepts that are not P, do not belong to the same genus — A, *B, C ... M* (see Fig. 13, p. 194). Opposite judgments will be the judgments "this ***S*** is *P*", "this ***S*** is *M*". They cannot both be true; if one is true and the other is false, but both can be false, the truth of one judgment does not follow from the falsity of one judgment. This position applies to any such pair of judgments: "this ***S*** is *P*", "this ***S*** is *A*"; "this ***S*** is P", "this ***S*** is *B*", etc. For example, "this rose is white", "this rose is red"; if it is true that this rose is white, it is not true that it is red, and vice versa.

§ 6. LOGICAL MEANING OF AFFIRMATION AND NEGATION

As we have seen, judgments are divided into affirmative and negative by quality. Affirmative judgments indicate the presence of a certain attribute in an object, while negative judgments indicate the absence of a certain attribute in an object. Affirmative judgments indicate what an object is, while negative judgments indicate what it is not. An affirmative judgment has the meaning that it indicates the correspondence of our thought to objective reality: it indicates that such and such an object or phenomenon exists, that they have such and such a property, that there is such and such a connection between objects or phenomena, etc. Affirmative judgments, if they are true, are always characterized by their direct connection with objective reality. If I assert something, formulate a positive thought, I thereby indicate certain specific features of objective reality. Therefore, an affirmative judgment, as a rule, has a specific meaning, directly expressed in it, and this meaning can be understood from an analysis of the judgment itself.

The situation is more complicated with negative judgments. Often, it is impossible to extract the meaning from the negative judgment itself. Let us take a simple example. I am asked the question: “Are you going home?” I answer: “No, I am not going home.” This negative judgment can have three meanings: 1) I am driving, not going home, 2) I am going, but not home, but somewhere else, 3) I am not going home, I am staying here. What meaning this judgment has in a particular case depends on its meaning, on the reason for the question, what caused it, etc.

Of course, affirmative judgments should also be connected with other judgments, and not considered in isolation, but in connection with the entire course of reasoning on a particular issue, but still affirmative judgments formulate thoughts positively and can often do so without regard to other thoughts, whereas a negative judgment, precisely because it denies something, can be understood only in connection with what this denial has to be done in relation to.

Let us give an example that occurs in the practice of the court. The chairman of the court asks the defendant during the hearing: “Do you plead guilty to the charge brought against you?” Let us assume that the defendant answered: “Yes, I plead guilty to this.” The meaning of this affirmative judgment is clear from the statement itself: the defendant admits that he committed the crime with which he is charged. Of course, further questioning of the defendant and verification of the evidence may introduce clarifications and changes to the charge brought against him, but even an affirmative answer by the defendant to the question of his guilt leaves no doubt as to the meaning of this judgment. Now let us assume that the defendant answered negatively: “No, I do not plead guilty to the charge brought against me.” This is a negative judgment that can have various meanings. For example, it may mean that the defendant completely denies having committed the actions that are attributed to him; he denies having done any of what he is accused of. This is one meaning that this negative judgment expressed by the defendant has. The second possible meaning: the defendant does not deny the very fact of his having committed these actions, but he denies their criminal nature. For example, he killed, but killed in a state of necessary defence, he did not squander the valuables entrusted to him, but spent them on official purposes, etc. This is expressed in the same form of a negative judgment: “I do not plead guilty.” Finally, the third possible meaning: the defendant pleads guilty to another, lesser crime, but rejects the wording in which the accusation is brought against him, for example, he pleads guilty to negligence, but denies the charge of embezzlement, or does not plead guilty to premeditated murder, but pleads guilty to reckless murder, etc. The defendant’s answer is the same in all cases: “I do not plead guilty to the charge brought against me,” but the meaning of the answer may be different. And only through further interrogation can a conclusion be drawn about what meaning is invested in the negative judgment expressed by the defendant. This means that the obligatory element of any negative judgment—”not,” “no (is not)”—can in fact have different meanings.

In textbooks of formal logic by bourgeois authors, negation is often given the character of a bare negation, i.e. the particle “not” or “no” means that what this “not” or “no” refers to does not exist, does not act, does not take place in reality, and nothing concrete that opposes this negation is implied. Thus, negation means only negation, and nothing is affirmed in negation. In ordinary, everyday thinking, the negation of something is at the same time the affirmation of something else; if we deny some property to an object, we thereby ascribe to this object some other property of the same kind. From the point of view of some bourgeois logicians, such an expansion of the meaning negation is invalid, negation means only negation, without any implied assertion. This point of view can be explained in the following way. If we say about some object that it is not painted white, then we usually mean that it is painted some other colour. According to the logical view under consideration, such an implication is invalid: the judgment “the object is not painted white” means only that the object is not painted white, but does not mean that it is painted some other colour, it may not be painted at all. Another example. If we make the judgment: “Ivan does not like Peter”, then this usually means that Ivan treats Peter somehow differently — does not like him, is indifferent to him, etc. According to the logical view under consideration, such a conclusion cannot be made: the judgment means only a simple negation “Ivan does not like Peter”, which is applicable to those cases when Ivan does not know Peter at all and does not treat him in any way.

This interpretation of negative judgments is incorrect, fundamentally flawed. It is a purely scholastic view. Understanding negation in all cases only as bare negation is in decisive contradiction with the usual structure of our thinking, but it is also incorrect because it deprives negation of any cognitive significance. If no assertion follows from negation, if from the judgment that a given object is not something one cannot draw any conclusion about the direction in which one should seek an answer to the question of what this object is, negative judgments cease to be a form of cognition of reality.

The real meaning of negation in logic is that if in a negative judgment the predicate denies the subject some feature, it is thereby implied that the subject has some other feature of the same kind. For example, “this paper is not white” means it has some other colour (black, blue, etc.), “this is not a rose” means it is some other flower (for example, a tulip, aster).

This position does not exclude the fact that in individual cases a negative judgment may have the meaning of a bare negation, when something is negated and at the same time no affirmation is implied. The incorrectness of the scholastic understanding of negation considered above lies in the fact that every negation was considered as a bare negation and in this was seen the very essence of negative judgments. But some negative judgments in meaning really do contain only a negation, without an implied affirmation. For example, if we inquire at the address office about some citizen and the address office answers that this citizen does not live in this city, then this is precisely a bare negation; the citizen does not live in the city, but the address office, giving such information, only says this, without at all asserting either that this citizen lives in some other city or that this citizen exists in the world at all.

There is another understanding of negation in the logical studies of bourgeois authors. According to this interpretation, a negative judgment means only the negation of an expressed or implied affirmative judgment. In itself, a negative judgment expresses nothing and has no meaning, and therefore cannot be considered as an independent type of judgment. It is used only in the sense of indicating the falsity of another, namely, affirmative judgment. This logical view was introduced into bourgeois logic by the German idealist philosopher of the 19th century, Siegwart.

This point of view must be rejected as idealistic. Its fundamental flaw is that not only is negative judgments not recognized as having independent significance, but it is declared that negation exists only in thoughts and has no relation to objective reality. But negation in reality is undoubtedly a real force; without negation, development would be unthinkable. Negation is a real moment of development, movement, and it is precisely this side of objective reality that negative judgments express in our thinking. This means that negative judgments, just like affirmative ones, express certain aspects of objective reality—nature, society. Of course, there may also be negative judgments whose meaning consists precisely in the negation of another affirmative judgment. For example, one person asserts: this book is interesting, and another objects: no, this book is not interesting. But this does not at all characterize the essence of all negative judgments and does not deprive them of their independent significance, which they have in the same way as affirmative judgments. In our everyday and scientific thinking, we constantly make negative judgments, for example, we point out that certain properties do not belong to certain objects, not because someone claims the opposite, but because we want to give a complete characterization of the objects in question.

Like affirmative judgments, negative judgments can be true or false: true when they correctly reflect objective reality, false when they incorrectly reflect it, distort, or deny what is in reality.

§ 7. WAYS OF DENIAL

As can be seen from the above, negation can have a dual meaning: 1) a negative judgment has an independent character if the non-existence of some fact, event or the absence of some feature in an object is indicated regardless of any actual or supposed assertion to the contrary, and 2) a negative judgment is a way of refuting, denying the truth of an expressed affirmative judgment. Negation in the first sense does not represent anything specific—it is an ordinary judgment, the meaning of which is revealed by means of its analysis and the truth or falsity of which is determined by its correspondence or non-correspondence to objective reality. Negation in the second sense has meaning only in connection with the affirmative judgment against which it is directed. In this sense, a negative judgment is a way of denying the truth of an affirmative judgment.

If we consider any affirmative judgment to be false, we deny it, dispute it by means of a corresponding negative judgment. In the logical square that we examined above, negative judgments E *and* O *can* serve as a means of denying affirmative judgments *A* and *I*.

Let's take judgment *A* — a general affirmative one. judgment . By what judgments is A negated according to the logical square? It is negated by two judgments: *E* — a general negative judgment and *O* — a particular negative judgment. Judgment E is a judgment contrary to judgment *A*, and judgment *O* is a contradictory judgment in relation to *A*. Therefore, *A* can be negated in two ways: either by a contrary judgment *E* — a general negative judgment, or by judgment *O* — a particular negative judgment contradicting A. Opposition. Between *A* and *E* is called a diametrical opposition. The negation of *A* by means of *E* is more decisive than the negation *of A* by means of *I*.

For example, someone said: “all metals are hard” (*A*). We do not agree with him. We can refute this judgment (general affirmative) with either a general negative judgment (*E*) or a particular negative judgment (*O*). Indeed, if we prove that E or *O is true*, then according to the rules of the logical square, judgment *A* must be recognized as false. But in each case it should be weighed whether it is expedient, whether it is correct to use judgment *E to refute judgment A* , since sometimes this can lead to error. If I contrast judgment A “all metals are hard” with the opposite judgment *E* “no metal is hard”, then this judgment will represent the other extreme and will be false just like the judgment A that I dispute. If, however, I contrast judgment A with the contradictory particular negative judgment *O* “some metals are not hard”, this will be a correct judgment, it is very easy to substantiate it (it is enough to point to mercury), and thereby the falsity of the general affirmative judgment *A will be established with certainty* .

In what case should judgment *A* be refuted by judgment *E* , and in what case by judgment *O*? A general affirmative judgment *A* is negated by a general negative judgment *E* when the falsity of judgment *A* consists in the incorrect attribution to the subject of the judgment of the attributes contained in the predicate. If we believe that the general affirmative judgment *A* “all *S* are *P*” is false because *S* cannot be *P at all*, that *S* is incorrectly ascribed an attribute *P that is not proper to it*, we deny the truth of judgment *A* by means of the contrary general negative judgment *E*. In this case we reason as follows: judgment *A* “all *S* are *P*” is false because “not a single *S* is *P*”. If we believe that the general affirmative judgment A “all *S* are *P*” is false because in reality “not all *S* are *P*”, “some *S* are not *P*”, i.e. the general character of the judgment, its quantity, is false, the negation of this judgment is carried out by means of the particular negative judgment *O*.

The negation of one contrary judgment by another contrary judgment, *A* with the help of *E* , is possible in cases where judgment *A* is incorrect in all respects, i.e. not only with respect to its general character, but also in general with respect to the connection between the subject and the predicate. For example, the false metaphysical assertion “species of animals and plants are created in a ready-made, unchangeable form” (*A*) is opposed to the correct scientific contrary judgment (*E*) —“species of animals and plants are not created in a ready-made, unchangeable form,” i.e. they were formed through a long process of evolution. But if the incorrectness of judgment *A* lies not in the incorrect connection between the subject and the predicate, as was the case in this example, but in the incorrectness of the general character of the assertion, then judgment A should be challenged not with the help of *E*, but with the help of O.

We have finished examining judgment as a form of thinking in which objective reality is reflected in human consciousness. In our thinking, various judgments are connected with each other in such a way that new judgments are derived from some judgments and thus through forms thinking called *conclusion n*.

Chapter IX. INDICATION. DIRECT INDICATION

1. The concept of inference. Types of inferences. 2. Direct inference. 3. The logical square method. 4. Transformation. 5. Reversal. 6. Contrast. 7. The nature and meaning of direct inferences.

§ 1. THE CONCEPT OF INTRUSION. TYPES OF INTRUSIONS

An inference is a connection of judgments, consisting of deriving a new judgment from one or more judgments. If we have some judgments and deduce a new judgment from these judgments, then we make an inference. For example, "knowledge of logic helps in mastering science; student Ivanov has studied logic well; therefore, it will be easier for Ivanov to study all other sciences."

The word "inference" can be understood in two ways: firstly, it means a way of combining judgments that yields a new judgment (conclusion, inference), and secondly, it means the new judgment being derived. In the following exposition, we will use the word "inference" in the first meaning, as a combination of judgments that yields a new judgment.

The judgments from which a new judgment is derived are called premises (praemissae), and the new judgment derived from the premises is called the conclusion (conclusio). Thus, in every inference there are premises (or at least one premise) and a conclusion.

The relationship between premises and the conclusion is the relationship of reason and consequence: the premises are the basis from which the conclusion follows as a consequence. It is this relationship between the premises and the conclusion that enables us to draw a conclusion from the premises. Consequently, inference is based on the law of sufficient reason (see Chapter II); a conclusion drawn from the premises is correct when the premises for the conclusion are a sufficient basis.

According to the number of premises, all inferences are divided into two groups: *direct* inferences and *indirect* inferences.

A direct inference is one in which the conclusion is made from only one premise, i.e. one judgment is derived from another. A mediated inference is one in which a new judgment is derived from two or more judgments.

Thus, in direct inferences there is only one premise, in mediated inferences there are two or more.

According to the nature of the connection between the premises and the conclusion, inferences are divided into *deductive* inferences and inductive inferences.

The difference between them is as follows.

When making inferences, in the process of our thinking we can go in two different directions. The first way: from general provisions we make a conclusion for a particular case. This is deductive inference — from the general to the particular. The other way: on the basis of individual particular cases we establish a general position. This is inductive inference — from the particular to the general.

An example of deductive reasoning: “All higher plants have a stem and leaves; mosses are higher plants; therefore, mosses have a stem and leaves.”

An example of inductive reasoning: people constantly observe that learning foreign languages is easiest in youth and much more difficult in mature years. And based on repeated observations of such cases, a general conclusion is made, a general conclusion: “language learning should be done as intensively as possible in youth, without putting it off until later years.” We have derived a general position based on many specific cases. Of course, this general position does not in the least eliminate the usefulness and expediency of learning foreign languages at any age.

This distinction between deductive and inductive inferences expresses, so to speak, the external properties of these two types of inferences. As we shall see below, the distinction between deductive and inductive inferences according to the indicated feature is conditional: there may be deductive inferences in which the conclusion is made from judgments of the same generality and in which, consequently, there is no direct sub-assumption of a particular case under a general rule, and there may equally be inductive inferences in which the conclusion is made not to a general position, but to a particular case. If we try to find the difference between deductive and inductive inferences not in the direction of thought, but in the nature of the connection between the premises and the conclusion, a deeper and more essential difference in the cognitive respect will be discovered between them. In deductive inference, the conclusion is contained in the premises and is extracted from them as a result of the inference. In other words, the conclusion we arrive at in a deductive inference connects only those concepts that were given in the premises, and only to the extent that they were taken in the premises, therefore, in the conclusion of a deductive inference, nothing can be said about those objects and phenomena that were not said in the premises. Let us take any deductive inference, for example, “every science requires labour for its assimilation; logic is a science; therefore, it requires labour for its assimilation.” The objects that are discussed in the conclusion—”logic” and “an object that requires labour for its assimilation”—have already been considered in the premises, and in the conclusion we are talking only about these objects, and only within the limits of what was said in the premises.

In inductive reasoning, the conclusion, the inference, extends to objects not considered in the premises, and the inference itself consists in the fact that from the facts considered in the premises, a conclusion is made about facts that were not considered in the premises.

Such, for example, is the inductive inference in which, from the constant observation of the absence of chlorophyll in fungi, we draw the general conclusion: “all fungi lack chlorophyll; we extend this conclusion to fungi that we have not observed, that we have not studied, and therefore our conclusion also applies to objects of this kind that were not considered in the premises of the inductive inference.

As we know, a judgment is a special connection of concepts; an inference is a connection of judgments, i.e. also a connection of concepts, but more complex. Each concept has a scope and content, therefore, in an inference, as in a judgment, concepts are connected by scope and content. In a deductive inference, the conclusion is limited by the scope and content of the concepts given in the premises, and cannot go beyond them, therefore, in the conclusion of a deductive inference, we can only talk about those objects that were discussed in the premises, and about those of their attributes (properties, states, etc.) that were indicated in the premises. In an inductive inference, the conclusion goes beyond the scope and content of the concepts connected in the premises, and can contain statements about objects and attributes of objects that were not considered in the premises.

Deductive and inductive inferences will be discussed in detail later, but now we will focus on direct inferences.

§ 2. DIRECT INDICATION

In direct inference, another judgment (conclusion) is derived from one judgment (premise). We have only one premise and from it we derive a conclusion without connecting this premise with any other judgments. Direct inference is obtained when it really has only one premise and we draw a conclusion from only one judgment. One can encounter many inferences that appear to be direct, when in reality they have not one but two premises, but one of them is not stated but implied, so the inference is mediated. For example, the inference "iron is a metal, therefore it is a simple body" seems direct, since it deduces from one judgment (premise) "iron is a metal" another judgment (conclusion) — “iron is a simple body”. In reality, this judgment has not one premise, but two premises: the judgment “metals are simple bodies” is not stated, but implied. Thus, the composition of this inference will be as follows: “metals are simple bodies” (one premise), “iron is a metal” (the other premise), “iron is a simple body” (conclusion). It is clear that this is not a direct inference, but an indirect one: a third judgment is deduced from two judgments. Thus, in a direct inference there must really be only one premise; we derive a new judgment only from one judgment, without connecting it with others or implying other judgments.

Direct inferences are formed in the following ways: 1) the logical square method, 2) transformation, 3) reversal, 4) opposition. Let us consider these methods separately.

§ 3. THE LOGICAL SQUARE METHOD

According to the rules of the logical square (see Chapter V III , § 3) truth or falsities one The truth or falsity of other judgments of the same matter is derived from a judgment . Thus, the truth of the subordinate judgment (*A* or *E*) follows from the truth of the subordinate judgment (*I* or *O*). If *A is true*, then *I is also true* ; if “all *S* are *P*” is true, then it is true that “some *S* are *P*”. For example, all capitalists are exploiters of other people’s labour, which means that some capitalists (American, English, etc.) are exploiters of other people’s labour. If *E is true, then O* is also true; “no *S* are *P*” means “some *S* are also not *P*”. For example, “no metal is transparent, which means that some metals are not transparent”. All these are direct inferences. In such direct inferences, the conclusion differs from the premise only in quantity (volume): in the premise, the subject is taken in its entirety (all *S* or none of *the S*), and in the conclusion—in part of its volume (some *S*), while the predicate is the same in both the premise and the conclusion.

Further, direct inferences can be formed in those cases when, according to the rules of the logical square, the truth of one judgment implies the falsity of another judgment (*A* and *E* , *A* and *O* , *E* and *I*). For example, judgment *A* “all birds are vertebrates” is a true judgment. From it we can deduce the falsity of the judgment “no bird is a vertebrate” (*E*), as well as the falsity of the judgment “some birds are invertebrates” (*O*).

Direct inferences are also formed when, according to the rules of the logical square, the truth or falsity of another is deduced from the falsity of one judgment (for example, from the falsity of *A* the truth of *O* , from the falsity of *I* the falsity of *A*).

For example, there is a French proverb “tout comprendre—tout pardonner»—«to understand everything—means to forgive everything». This position can be expressed in the judgment: «all human actions can be justified, forgiven». This is a false judgment, a false thought, justifying the most disgusting actions cultivated in bourgeois society: after all, every crime, every villainy can be understood, explained, you just need to find its cause. From the falsity of this judgment (*A*) follows the truth of the contradictory judgment: «some human actions cannot be justified, cannot be forgiven» (*O*).

§ 4. TRANSFORMATION

The transformation of a judgment consists in the fact that its quality changes in the judgment: an affirmative judgment is transformed into a negative one, and a negative one into an affirmative one. For example, "all birds (are) vertebrates (premise), therefore no bird (is) an invertebrate animal (conclusion)". Or: "no metal is transparent (premise), therefore all metals (are) opaque bodies (conclusion)". Thus, the judgment A is transformed into the judgment *E*, and *E* into *A*, just as *I* into *O* and *O* into *I*.

A judgment transformed by conversion, i.e. the conclusion of a direct inference constructed in this way, although it contains the same concepts from which the premise was composed, still differs from the premise. If the premise indicates what an object is, what it is, then the conclusion states what it is not, what it is not. And vice versa: if the premise indicates what an object is not, the conclusion will indicate what it is.

Therefore, in the conclusion the shade of thought may change in comparison with the premise. Let us take the following example. We say: "idealism is not a scientific worldview." In this judgment, the subject (idealism) is denied the attribute of a scientific worldview, expressed by the predicate of this negative judgment. Let us transform this judgment, i.e. express it in an affirmative form. Then we obtain the judgment: "idealism is an unscientific worldview." This is an affirmative judgment. It is true, like the original negative judgment, but in it the thought is expressed more decisively, categorically and definitely: we assert that idealism is unscientific, that it is fideism, clericalism.

We have already used the transformation of negative judgments to determine the relations of incompatible judgments of different matter.

§ 5. APPEAL

The inversion of a judgment consists in the formation of a new judgment in which the original predicate is taken as the subject, and the original subject as the predicate.

Thus, in a direct inference formed by means of reversal, the conclusion and the premise differ from each other in that the subject of the premise is the predicate of the conclusion, and the predicate of the premise is the subject of the conclusion.

There are two types of conversion: *simple conversion , or pure conversion* (conversio simplex), and *conversion through restriction* (conversio per accidens). With simple inversion, the predicate becomes the subject, and the subject becomes the predicate without changing their scope. *Simple inversion of judgments is possible only in relation to those judgments in which the subject and predicate have the same scope, so that the subject of the judgment can become predicate, and the predicate the subject, and the new judgment will also be correct*. As we already know, the volumes of the subject and predicate are the same in those judgments that express the definition of concepts, and it is precisely by means of such a simple inversion of the definition, i.e. by rearranging the defined and defining concepts, that the logical correctness, proportionality (adequacy) of the definition is verified (see Chapter V, § 5).

For example, let us take the proposition (definition) “logic is the science of the laws of correct thinking.” Let us perform a simple inversion and obtain a new proposition: “the science of the laws of correct thinking is logic.” This is correct. Another example: “a square is a rectangle, all sides of which are equal.” Let us perform a simple inversion and obtain: “a rectangle, all sides of which are equal, is a square.” And this is correct. Thus, a simple inversion is possible only in relation to those propositions, the subject and predicate of which have the same volume. In these cases, having one proposition, we derive another from it by rearranging the subject and predicate of the first proposition and thus construct a direct inference.

If the subject and predicate of a judgment do not have the same volume, and the volume of the predicate is greater than the volume of the subject (which usually happens in general affirmative judgments), then a simple inversion is impossible; in this case, a direct inference is formed by an inversion through limitation.

An appeal through restriction is the formation of a new judgment in which the original predicate becomes the subject with a restriction of its scope.

Let’s take the example: “all cows are herbivores”. In this judgment, which is universally affirmative (*A*), the predicate is not distributed, and the scope of the concept “herbivores” is greater than the concept “cows”, since the scope of the concept “herbivores” includes many other animals in addition to cows. Let’s try to make a simple inversion of this judgment. We get: “all herbivores are cows”. The judgment is clearly incorrect, not all herbivores are cows. Let's limit the scope of the new subject (in the original judgment — the predicate), i.e. we will not speak about all herbivores, but only about some of them. We get: "some herbivores are cows". This is a correct judgment, obtained by inverting the first judgment "all cows are herbivores" *through a restriction.*

Thus, a general affirmative judgment (A) can be converted through restriction and after restriction becomes a particular affirmative judgment (I), except in cases of equality of the volumes of the subject and predicate, when a general affirmative judgment (A) can be converted simply and after conversion remains a general affirmative judgment.

An error encountered in the process of thinking is the use of a simple inversion of a general affirmative judgment when only an inversion through restriction is permissible. Having expressed a correct general affirmative judgment, we sometimes draw a conclusion from it by making a simple inversion of this judgment, although the volumes of the subject and predicate are not the same, and, consequently, the conclusion can be made only by restricting the volume of the previous predicate. For example, let us take the general affirmative judgment "all poets are impressionable." This is a correct judgment. But from it they sometimes draw the conclusion: "therefore, all impressionable people are poets," and on this basis a person, noticing increased impressionability in himself, is sometimes inclined to consider himself capable of poetic creativity, without having any data for this. But the point is that the general affirmative judgment "all poets are impressionable" is not subject to simple conversion, since the subject and predicate have different volumes, and can only be subject to conversion through restriction: “some impressionable people are poets.”

For other types of judgments, the following rules for their treatment can be established.

The general negative judgment (E) is subject to simple reversal . Indeed, if “no *S* is *P*”; then, obviously, “no *P* is *S*”. If the entire scope of the concept *S* is excluded from the entire scope of the concept *P*, then the entire scope of *P* is excluded from the entire scope *of S*: “no mammal breathes with gills, therefore no animal breathing with gills is a mammal”.

The particular affirmative judgment (I) is also subject to simple reversal. For example, “some mushrooms are poisonous (i.e. are poisonous plants), therefore some poisonous plants (are) mushrooms.”

A particular negative judgment (*O*) is not subject to reversal at all. This is explained by the fact that when reversing, the conclusion must remain negative (as well as the premise); therefore, its predicate must be distributed. But the predicate of the conclusion is formed from the subject of the premise, which is not distributed (as in all particular judgments). Consequently, the premise does not provide material for the predicate of the conclusion, and the reversal itself is impossible.

The significance of the conversion is that in the conclusion of a judgment transformed in this way, a thought is expressed not in relation to the object that was expressed by the subject of the premise, but to another—the one that was expressed by the predicate, and this, as in the transformation of a judgment, somewhat changes the thought expressed in the judgment that serves as the premise of the immediate inference.

§ 6. CONTRAST

Contrast consists in the transformation of a judgment and the subsequent reversal of the transformed judgment. First we transform the judgment, then we reversal this transformed judgment. This method of forming a direct inference is called *contrast* in the sense that in this inference-concept, which is the predicate of the premise, a concept contradicting it is contrasted with a concept, and this latter concept becomes the subject of the conclusion. In other words, in those inferences that are formed by contrast, the conclusion contains a statement about a concept contradicting the concept of the predicate of the premise. Let us take the judgment: "all metals are simple bodies." Let us transform this general affirmative judgment (*A*), i.e., make a general negative judgment (*E*) out of it. We obtain the judgment: "no metal is not a simple (i.e., complex) body." Now let us reversal this judgment. We get: "no non-simple body is metal." In the conclusion of this inference, the subject, i.e. the object about which something is said, is a non-simple (complex) body, i.e. a concept that contradicts the one that is the predicate in the premise — a simple body. The predicate in the premise was the class of simple bodies, and the subject in the conclusion is the class of non-simple (complex) bodies.

In a conclusion formed by contrast, the thought expressed in the conclusion may differ from the thought expressed in the premise to a greater extent than in the case of transformation and reversal. Let us cite an example from current Soviet legislation. "All crimes are socially dangerous actions" (see Criminal Code of the

RSFSR, Article 6). Let us transform this judgment: “no crime is a non-socially dangerous action”; let us invert this judgment: “no non-socially dangerous action is a crime.” This last judgment introduces a new idea of great importance: actions that are not socially dangerous cannot be considered crimes. This is the conclusion reached by the Criminal Code: “An action is not a crime if, although it formally falls under the characteristics of any article of the Special Part of this Code, due to its obvious insignificance and the absence of harmful consequences, it is devoid of the character of being socially dangerous” (Criminal Code of the RSFSR, note to Article 6). This is a very important provision, eliminating the possibility of conviction in criminal proceedings only on formal grounds, in the absence of social danger of the committed act. Of course, this provision was established in the Soviet Criminal Code not at all on formal-logical grounds, but because it corresponds to the principles and tasks of Soviet Criminal Law. But at the same time, it represents a logical consequence, following from the definition of a crime as a socially dangerous act adopted in the Criminal Code, and this consequence is obtained by contrasting it with the premise expressing the essence of the crime.

§7. THE NATURE AND SIGNIFICANCE OF DIRECT INFERENCES

As can be seen from the above, immediate inferences are made by transforming a judgment: the quality of the judgment, the relationship of its elements, changes, and thus a new judgment is created, which is a transformed original judgment. On this basis, many logicians believe that there is no inference here at all, but simply a transformation of the judgment, a logical operation on the judgment; the inference can only be mediated, in which the conclusion is made from at least two premises. According to this view, the so-called “immediate inferences” lack the property that characterizes every genuine inference: an expansion of knowledge. The conclusion of an immediate inference contains only what is in the judgment that serves as a premise; consequently, it does not expand our knowledge in comparison with that which was given to us in the premise, and therefore, in the opinion of the above-mentioned logicians, this is not an inference at all, but only a certain reconstruction of the original judgment. One cannot agree with this point of view. It is true that the conclusion of an immediate inference refers to the same objects of thought that were discussed in the premise. It is also true that an immediate inference is actually created by transforming the judgment that serves as the premise. But this does not deprive the conclusion of the character of an inference. As we have seen when considering all the methods of forming immediate inferences, the conclusion is a thought that has been changed to a certain extent in comparison with that contained in the original judgment that serves as the premise, i.e., in the logical relation new thought . So , from one another thought is derived from a thought, and this is a conclusion.

When a judgment is transformed, instead of affirming something, we express a negation, and vice versa; when a judgment is reversed, we first express something about some objects, expressed by the concept of the subject, and then we express something no longer about these objects, but about others, previously expressed by the predicate of the judgment (premises). In opposition, as we saw above, the originally expressed thought can change even more significantly. Therefore, although the expansion of our knowledge about the subject in direct inference is insignificant compared to mediated inferences , it still exists. The expansion of “knowledge” occurs not only by connecting thoughts, but also by deducing from one thought a consequence that follows from it, and this is direct inference. This property of direct inference is well expressed in our everyday thinking, for example: “all citizens are obliged to observe the laws, *therefore* no person can fail to observe them (i.e. violate them)”; this is a transformation in which even the grammatical form indicates inference (“therefore”).

Having recognized immediate inference as a valid inference, although of limited cognitive value, it should also be recognized that immediate inferences relate to deduction, are deductive inferences. Immediate inferences are fully consistent with the general concept of deductive inferences, which are characterized (in contrast to induction) by the fact that the conclusion is drawn from the premises and extends only to those objects that were stated in the premises. This property of deductive inferences is present in all immediate inferences.

* * *

We have considered direct inferences. They serve as a means of developing thought, but in them the development of thought occurs to an insignificant degree. Much greater results for the development of thought are given by mediated inferences, where the conclusion is made from two or more premises. In these inferences we connect judgments and obtain a new judgment from the connection of two or more premises. It is in this way that thoughts develop in our thinking.

Let us move on to the consideration of mediated deductive inferences, called *syllogisms*.

Chapter X. SYLLOGISM

1. The concept of a syllogism. 2. The composition of a syllogism. 3. The axiom of a syllogism. 4. The rules of a syllogism. 5. The figures of a syllogism. 6. The modes of a syllogism. 7. The characteristics and meaning of the figures of a syllogism. 8. Reducing the figures of a syllogism to the first figure. 9. Hypothetical (conditional) syllogism. 10. Disjunctive syllogism. 11. Dilemma. 12. Enthymeme. 13. Epicheirema. 14. Polysyllogism. 15. Paralogisms and sophisms. 16. The meaning of a syllogism. 17. On the so-called "non-syllogistic inferences".

§ 1. THE CONCEPT OF SYLLOGISM

A syllogism is a mediated deductive inference in which a conclusion conditioned by two premises is derived from them. A syllogism is a mediated inference because it has two premises, i.e. two judgments, from the combination of which a new judgment—a conclusion—is derived. A syllogism is a deductive inference because its conclusion is derived from the premises, extracted from them, and relates only to those objects, phenomena, and events about which certain statements were contained in the premises.

The typical form of a syllogism is to bring a particular case under a general rule and to deduce from this general rule the consequences that follow for the particular case. As we shall see further, it is precisely this relation of the premises of a syllogism that makes it possible to deduce from the premises the conclusion that necessarily follows from them: what we express in the form of a general proposition with respect to the entire class of certain objects, we relate in the conclusion to individual parts of this class, to individual groups of objects or to individual objects included in this class.

In our everyday thinking, as well as in scientific thinking, syllogism-based inferences are made constantly. When we encounter a particular fact, event, or question, we usually consider it from the point of view of a more general position, rule, evaluate this fact, event, and resolve this question based on this general rule. For example, we receive information about the actions of a person, we learn that he does not raise his children, does not care for them. We know the general rule, the general position: a Soviet citizen must care for his children, raise them, and grow up to be worthy members of socialist society. This person does not raise his children, does not care for them. We conclude: this person does not fulfil his duties to society, his behaviour should be assessed as not corresponding to the norms of socialist society. As we see, we have brought the particular case relating to the behaviour of this person under the general rule relating to all Soviet citizens and to the behaviour of each of them, and have drawn a conclusion arising from this general rule for the case under consideration.

Another example of a syllogism: "all liquids are elastic; water is a liquid; therefore, water is elastic." "All liquids are elastic" is a general proposition. A special case: "water is a liquid." We bring this special case under the general rule and draw a conclusion regarding this special case, namely: "water is elastic."

Syllogisms in which the premises are categorical judgments are called categorical syllogisms. The categorical syllogism is the basic form of syllogistic inference, and when we speak of a syllogism, we mean the categorical syllogism. Other forms of syllogism will be discussed separately later, but now we will consider the categorical syllogism.

§ 2. COMPOSITION OF A SYLLOGISM

A syllogism consists of three propositions: two premises and a conclusion. The first premise, usually containing a general rule, is called the major premise of the syllogism. The second premise, usually concerning a particular case, is called *the minor premise*. The third proposition, which we deduce from the premises, is called *the conclusion*. In the example we gave above, the major premise is "all liquids are elastic," the minor premise is "water is a liquid," and the conclusion is "water is elastic."

As we know, every judgment has two terms—subject and predicate. In a syllogism there are three judgments, but it has only three terms, not six. In the conclusion of a syllogism, both terms—subject and predicate—do not appear for the first time: one term is in the major premise, the other in the minor. Thus, the two terms of the conclusion are at the same time terms of the premises, and besides, both the major and minor premises have one common term that is not in the conclusion. This means that there will be three terms in total. "All metals are simple bodies" is the major premise: the subject is "all metals", the predicate is "simple bodies". "Iron is a metal" is the minor premise: the subject is "iron", the predicate is "metal". This means that the major and minor premises have one common term—"metal"; the conclusion is "therefore, iron is a simple body". in the conclusion we have two terms — "iron" and "simple body", and in total there are three terms: "metal", "simple body" and "iron". The two terms that are in the conclusion are called extreme *terms* ; of these, the term that is contained in the major premise and is the predicate of the conclusion is called the major term, and the term that is contained in the minor premise and is the subject of the conclusion is called the minor *term* . The term that is not in the conclusion, but which is found in the major and minor premises as common to them, is called the middle term. Terms in a syllogism are designated: major — by the letter *P*, minor — by the letter *S* and the middle term—the letter M (from the Latin word Medius—middle). Our example of the syllogism "all metals are simple bodies; iron is a metal; therefore, iron is a simple body" can be expressed by the following formula:

$$\frac{\begin{array}{c} M - P \\ S - M \end{array}}{S}$$

where *P* is the major term, "simple bodies", *S* is the minor term, "iron", *M* is the middle term, "metals".

It is not always easy to determine in a syllogism which premise is the major and which the minor, which term is the major and which the minor. The premise may be expressed in such a way that the general rule and the particular case are not immediately apparent, for example when both premise are general propositions (*A, E*). Likewise, the arrangement of the premise may be such that the minor premise is indicated first and not the major premise. To solve this problem, one should proceed in the following way. First of all, one should separate the conclusion from the premise, i.e. find the proposition that is deduced from the other propositions. In this way we also establish the premise. Then we look for the middle term. The middle term is the concept that is present in both the major and the minor premise, but is not present in the conclusion. "Water is a liquid; all liquids are elastic; therefore, water is elastic." The middle term (*M*) here will be "liquid", since the concept "liquid" is present in both premises, but is not present in the conclusion ("water is elastic"). The extreme terms are in the conclusion, and the minor term (*S*) is the subject of the conclusion (in this case, "water"), and the major term (*P*) is the predicate of the conclusion ("elastic substance"). The predicate of the conclusion "elastic substance" is in the judgment "all liquids are elastic" (i.e., are elastic substances), so this is the major premise. The subject of the conclusion "water" is in the judgment "water (is) a liquid", therefore this is the minor premise.

The meaning of such a structure of the syllogism is as follows:

In the major we know the relation between the major and the anterior terms; in the minor premise we know the relation between the minor and the middle terms, in other words, in the major and minor premise we know the relations of *S* and *P* to *M*. On the basis of the relation of the two extreme terms to the common middle term known to us, we draw a conclusion about the relation existing between the extreme terms. That is why the middle term, which is present in both premises, is absent from the conclusion: it has already fulfilled its role, connecting the extreme terms.

The characteristic feature of a syllogism as a mediated deductive inference is precisely the presence of a middle term in the premises. This middle term is a necessary condition for a syllogistic inference, since it connects the premises and makes it possible to extract a conclusion that necessarily follows from the premises.

Let us give another example. “In order to eliminate the disasters and misfortunes that the working class and all working people suffer in capitalist countries, it is necessary to eliminate their cause; the cause of these disasters and misfortunes is capitalism, the capitalist social system; therefore, in order to eliminate the disasters and misfortunes that the working class and all working people suffer in capitalist countries, it is necessary to destroy capitalism, the capitalist social system.” The middle term in this syllogism is “the cause of the misfortunes and misfortunes of the working class and all working people in capitalist countries.” This concept connects the premises and necessarily conditions the conclusion that follows from them.

§ 3. AXIOM OF SYLLOGISM

The outlined structure of the syllogism and the possibility of drawing a conclusion from the premises in the conclusion are based on the so-called axiom of the syllogism. An axiom is generally a position accepted as true and not requiring proof. An axiom of the syllogism is a position that does not require proof, which provides the possibility of drawing a conclusion in the syllogism as a result of subsuming the minor premise under the major one.

The axiom of a syllogism is a rule denoted in logic by the Latin formula dictum de omni et de nullo (literally—said about everything and about none), or, more briefly, dictum de omni. This formula is an abbreviated expression of the following rule: *whatever is affirmed with respect to a class of objects is affirmed with respect to any individual object belonging to that class and to any group of these objects; whatever is denied with respect to a class of objects is denied with respect to any individual object of that class and to any group of them.*

"All liquids are elastic; water is a liquid, therefore water is elastic." Here it is asserted that all liquids are elastic, therefore the same is asserted with respect to individual types of liquids, in this case with respect to water.

"No fish breathes with lungs; a shark is a fish; therefore a shark does not breathe with lungs." Here it is denied with respect to the whole class of fish that they belong to the class of lung-breathing animals; therefore the same is denied with respect to any species of fish, in this case sharks.

The axiom of syllogism expressed in this way justifies the possibility of drawing conclusions from the premises of the syllogism, based on the relationship between the volumes of the concepts from which the premises and the conclusion of the syllogism are composed: the volume of one concept is included in the volume of another or excluded from it. Thus, in the first example, water is included in the class of liquids, and liquids are included in the class of elastic bodies. In the second example, the class of fish is excluded from the class of animals that breathe with lungs, and the class of sharks included in it is excluded along with the class of fish. But we know that each concept has a volume and content, and the relationship between concepts can be considered both from the side of volume and from the side of content. Therefore, the axiom of syllogism can also be formulated from the side of the content of the concepts linked in the syllogism. Then the axiom of syllogism will be expressed by the Latin formula: nota nota est note rei; repugnans nota repagnate rei, which means: the attribute of the attribute of a thing is the attribute of the thing itself; that which *contradicts the attribute of a thing, contradicts the thing*. A given thing is characterized by some attribute, this attribute in turn is characterized by another attribute, which means that this latter attribute ("attribute of the attribute") is also a attribute of the given thing. In the above example of the syllogism "all liquids are elastic; water is a liquid; therefore water is elastic", such an axiom of the syllogism is expressed as follows. Water is characterized by the attribute (property) of liquid, and liquid is characterized by the attribute (property) of elasticity; therefore, the attribute of elasticity is also characteristic of water. And conversely, if some attribute contradicts the attribute of a thing, is incompatible with it, it cannot be an attribute of the thing itself. This is evident in the other example given above: "no fish breathes with lungs; a shark is a fish; therefore, it does not breathe with lungs". A shark is characterized by the attribute (property) of a fish, but a fish does not have the attribute of breathing with lungs; therefore, this last feature is not inherent in the shark either.

In any syllogism one can find the application of the axiom of syllogism in both variants—from the side of volume and from the side of content. Sometimes in the works of bourgeois logicians attempts are made to reject the axiom of syllogism, expressed as dictum de omni (said about everything), and build the doctrine of syllogism on the axiom nota notae (sign of a sign). This point of view is absolutely incorrect.

We know that every concept has a scope and content that are not artificial designations, but reflect the properties of objective reality: the scope of a concept is the objects themselves, the phenomena of reality, covered by the concept, and the content is the attributes, properties and states of these objects and phenomena. If a concept is true, it expresses the actual properties of actually existing objects and phenomena. Therefore, any inference that represents a complex connection of concepts connects these concepts both in relation to their scope and in relation to their content, which is expressed in a syllogism. Axiom dictum de omni is based on the scope of the concepts (terms) connected in the syllogism, but it also points to their content, i.e. to the characteristics of the objects they cover. Indeed, "what is said about everything" (i.e. about the whole class) points to the class, i.e. to the scope of the concept, but at the same time it also points to what is said about the class, i.e. what characteristics are attributed to the objects that make up this class, and this is the content of the concept. Therefore, the formula nota notae has only the meaning of explaining the formula dictum de omni from the content side.

The acceptance of only one formulation of the axiom of syllogism, as nota notae , means the elimination of the volume of concepts, judgments and conclusions, i.e. the objects and phenomena of reality themselves, which our thought reflects. Therefore, the construction of a syllogism only on the axiom nota notae has an idealistic character and should be rejected,

§ 4. RULES OF SYLLOGISM

A syllogism-based inference is subject to certain logical rules, without which it is impossible to construct a syllogism correctly, i.e. it is impossible to draw a correct conclusion from the premises. There are seven such rules. Let us consider them separately.

1. *In every syllogism there must be three terms and no more than three: P—the major term, S —the minor term, and M—the middle term.*

The major premise contains *P* and *M*, the minor premise contains S and *M*, *and* the conclusion contains *S* and *P*. If the syllogism has not three but four terms, then the possibility of connecting *S* and *P is eliminated*, and since it is impossible to connect *S* and *P*, then, consequently, it is impossible to draw a correct conclusion.

The introduction of four terms into a syllogism is a serious logical error that causes an incorrect, false conclusion. Usually, four terms appear in a syllogism when the same concept in different premises receives different meanings, so that it seems that there are three terms, but in fact there are four. This error in logic is called *quadrupling* terms (quatermo terminorum).

Let us give an example: “matter is eternal; cloth is matter.” It would be absurd to conclude that cloth is eternal. If such a conclusion were made, it would be an error expressed in a quadrupling of terms: the term "matter" in the two premises is taken in different senses. In the major premise, the term "matter" is taken in the philosophical sense, and in the minor premise, the term "matter" is taken in the sense of fabric.

As is well known, the word "speculation" has two meanings. Speculation refers to a crime punishable by law: "the purchase and resale by private individuals for profit (speculation) of agricultural products and consumer goods" (Criminal Code of the RSFSR, Article 107); speculation also means the so-called "speculative" idealistic philosophy, which draws its conclusions from abstract positions, and not from experience. It would be absurd to draw any conclusion from premises in which the concept of "speculation" is taken in these different meanings.

Of course, in the two examples given, the quadrupling of terms is so obvious and the resulting conclusion is so meaningless that no one will make such a mistake. But in some cases, the quadrupling of terms in a syllogism is difficult to notice; the conclusion of the syllogism, although incorrect, is not meaningless, as a result of which the quadrupling of terms leads to incorrect conclusions, the falsity of which is sometimes not detected. In our reasoning, we sometimes use the same concepts, putting different meanings into them, giving them different shades. This is especially true for various abstract concepts, such as "good," "kind," "conscientious," "expedient," "inexpedient," "interest," "benefit," etc.

Let's give an example. The head of one enterprise released a large batch of defective products from the enterprise, for which he was brought to criminal responsibility and brought to trial. At the trial, the defendant, without denying the fact of the release of defective products, cited the following argument in his defence: as the head of the enterprise, he was obliged to ensure the interests of the enterprise, but leaving the resulting defective products without selling them was not in the interests of the enterprise, since it put it in a difficult financial situation, therefore, guided by the interests of the enterprise, he released defective products to the consumer. This justification was, of course, completely untenable, and the defendant was convicted, having suffered a well-deserved punishment. But it is interesting to note that the defendant's reasoning was also logically incorrect, since it contained a quadrupling of terms: the concept of the interests of the enterprise in the premises had different meanings.

The major premise (the head of the enterprise must act in the interests of the enterprise) refers to the legitimate interests of the enterprise, its development and strengthening as a link in the system of socialist economy. The minor premise (the release of defective products from the enterprise meets the interests of the enterprise) does not refer to this interest of the enterprise, but to something completely different — to an incorrectly understood, illegal interest, to the interest of “one's own bell tower” to the detriment of the interests of the national economy.

2. *The middle term must be distributed in at least one of the premises. If the middle term is not distributed in any of the premises, no conclusion can be drawn from these premises.* A term is distributed—this means that the concept expressed by this term is taken in its entire volume, i.e. the judgment contains a statement (affirmation or negation) regarding the entire volume of the concept, regarding all objects covered by

this concept. The middle term M must be distributed in at least one of the premises, and if it is not distributed in any of the premises, i.e. in both premises it is taken only in part of its volume, it is impossible to draw a conclusion from such premises, since the middle term in both premises may relate not to the same, but to different objects, and therefore will not connect the extreme terms. Let us take the following example: "people who successfully graduate from a higher education institution know their specialty well; comrade N. knows his specialty well." One cannot conclude from these premises that comrade N. successfully graduated from the university: he could have not studied at the university at all, but acquired the necessary knowledge through independent study of this science and practical work. If the conclusion had been made, the syllogism would have been incorrect, since the middle term "persons who know their specialty well" is not distributed either in the major premise, which is a general affirmative judgment, or in the minor premise, which is an individual affirmative judgment, which, as we know, is considered a general affirmative judgment in logic. Now let us take the example that we have already given: "all metals are simple bodies; iron is a metal; therefore, iron is a simple body." In this syllogism, the middle term (metals) is distributed in the major premise, so the conclusion is correct.

3. *A term that is not distributed in the premises cannot be distributed in the conclusion.* This means that if any of the extreme terms, i.e. *S* or *P* , is not taken in the premises in its entirety, but only in part, then in the conclusion it can also be taken in part, and not in its entirety. In other words, if the major or minor premises do not speak about all the objects to which a

given concept pertains, but only about a part of these objects, then in the conclusion one can also speak only about a part of the objects. This follows from the general position that the conclusion of a syllogism can contain a statement only about those objects that were spoken about in the premises. Let us give an example: “all liquids are elastic; water is a liquid, therefore water is elastic.” The minor term (the subject of the conclusion) “water” in the minor premise is distributed, since it is said of all water that it is a liquid, therefore the subject in the conclusion is also distributed — “all water is elastic”. The major term (the predicate of the conclusion), i.e. “elastic bodies”, is not distributed in the major premise, since it is not said of all elastic bodies, but only of those that are liquids. Therefore the predicate of the conclusion “elastic” (i.e. “elastic body”) is not distributed, it is not said of all elastic bodies, but only of those that are water. Let us recall that in affirmative judgments the predicate is not distributed as a general rule (see Chapter VII , § 11).

Another example: “all military personnel must be disciplined; this man is not a military man.” Can one conclude from these premises that this man must not be disciplined? If such a conclusion were made, then in this conclusion “this man must not be disciplined” the predicate (people who must be disciplined) would be distributed (since the predicate in every negative judgment is distributed); in the major premise, however, this term was not distributed, since in an affirmative judgment (“all military personnel must be disciplined”) the predicate is not distributed. Consequently, the incorrectness of this syllogism lies in the fact that the major term (“people who must be disciplined”) in the conclusion of the syllogism turned out to be distributed, i.e., taken in its entirety, whereas in the major premise it was not distributed, i.e., it was not taken in its entirety, but only in part.

4. *No conclusion can be drawn from two negative premises* . In a syllogism, at least one premise must be an affirmative proposition. If both premises are negative, no conclusion can be drawn. This rule follows from the fact that M connects *S* and *P* with each other. If both premises were negative, M could not connect *S* and *P* , because it itself is not connected with either *S* or *P*. For example, “some students fail exams; high school students are not students.” Of course, no conclusion follows from these premises.

5. *If one premise is a negative judgment, then the conclusion must also be negative and cannot be affirmative*. Linking this rule with the fourth, we can say: if both premises are negative, then no conclusion can be made at all, and if one premise is negative, then the conclusion will also be negative. The presence of one negative premise in a syllogism means that the syllogism denies the connection of one of the extreme terms (*S* or *P*) with the middle term M, and therefore the conclusion will also deny the connection of *S* and *P*, i.e., the conclusion will be negative (*S* is not *P*). For example, “all honest people take care of the public property; citizen N. does not take care of the public property; therefore, citizen N. is not an honest man.” The minor premise in the syllogism is negative, and the conclusion will also be negative.

6. *From two private parcels it is forbidden withdraw none conclusions* . If both premises—the major and the minor—are particular judgments, i.e. *I* and *O* , then no conclusion can be drawn from them. Indeed, particular judgments contain a statement only about a

part of the volume of their subject. Therefore, it is unknown whether both premises concern the same part of the volume of a concept common to them—the term *M* —or whether they concern different parts that do not coincide with each other. For example, “some birds swim; some birds cannot fly.” No conclusion follows from these premises.

7. *If one premise is a particular judgment, then the conclusion must also be particular*. This rule follows from the fact that if one premise is a particular judgment, then the middle term refers to a part of the volume of one of the extreme terms, and not to its entire volume. Therefore, the conclusion will also be particular. For example, “advanced people are free from superstition (i.e., not superstitious); some people are superstitious, therefore some people are not advanced.” The syllogism is constructed correctly, the conclusion in it will be particular, because the minor premise is a particular judgment. Linking this rule with the sixth, we can say this: if both premises are particular, no conclusion can be drawn, and if one premise is particular, the conclusion will also be particular.

These are the rules of syllogism. If any of these seven rules are not fulfilled, the syllogism will be invalid, we will make mistakes in it and come to the wrong conclusion.

§ 5. FIGURES OF SYLLOGISM

As we already know, in each syllogism the two extreme terms, i.e. *S* and P, are connected to each other by means of the middle term M. *M occurs* in both the major and minor premises, but it can occupy different places in these premises. Depending on the place occupied by the middle term in each premise, the figures of the syllogism are distinguished. *The forms of the syllogism, distinguished by the position of the middle term in the premises, are called figures of the syllogism*.

There are four figures of syllogism.

The first figure is defined by the fact that in it the middle term M is the subject of the major premise and the predicate of the minor premise. The scheme of the first figure is as follows:

$$\frac{\begin{array}{c} M—R \\ S-M \end{array}}{S-P}$$

The majority of the syllogisms cited in this chapter belong to the first group: for example, "all liquids are elastic; water is a liquid; therefore, water is elastic," etc.

The second figure is determined by the fact that the middle term M in both premises is the predicate. The scheme of this figure is as follows:

$$\frac{\begin{array}{c} P-M \\ S-M \end{array}}{S-P}$$

Example: "all honest people treat the public property with care; citizen N. does not treat the public property with care; therefore, he is not an honest person."

The third figure — in it the middle term M in both premises is the subject:

$$\frac{\begin{array}{c} M - P \\ M - S \end{array}}{S - P}$$

Example: "all metals are simple bodies; all metals are electrical conductors; therefore, some electrical conductors are simple bodies."

The fourth figure — in it the middle term M is the predicate in the major premise, and the subject in the minor premise:

$$\frac{\begin{array}{c} P - M \\ M - S \end{array}}{S - P}$$

For example, "all true patriots are capable of sacrificing themselves for their country; no man capable of sacrificing himself for his country can be a coward; therefore, no coward can be a true patriot."

§ 6. MODES OF SYLLOGISM

As we know, all judgments by quantity and quality are divided into four types — general affirmative (*A*), general negative (*E*), particular affirmative (*I*) and particular negative (*O*). Depending on which judgments from the four types make up the premises of the syllogism, the modes of the syllogism are distinguished. *Modes syllogisms are called types of syllogism, distinguished by the number and quality of those judgments that make up its premises.* Each figure has several modes.

The modes of syllogism are designated by three capital letters, denoting successively the major and minor premises and the conclusion. For example, a mode such as *AAA* denotes a syllogism in which the major premise, minor premise and conclusion are universal affirmative judgments; *E IO* denotes a syllogism in which the major premise is a universal negative judgment, the minor premise is a particular affirmative and the conclusion is a particular negative.

In every syllogism there are three propositions—a major premise, a minor premise, and a conclusion; each of these propositions can be one of the four types indicated (*A, E, I, O*). There can be 64 possible combinations of propositions that make up the premises and conclusion of a syllogism: *AAA, AAE, AAI, EEE , EEI,* etc. But not all of these combinations can be modes of a syllogism, since many of them contradict the rules of syllogism already known to us. For example, such modes as *EEE* or *EOO*, etc., are impossible, since both premises in them are negative, and a conclusion cannot be made from two negative premises. Some combinations are impossible not in general, but in individual figures, since in them the middle term is undistributed, or in the conclusion the extreme term that was not distributed in the premises is distributed.

If we exclude from the 64 possible combinations all those that contradict the rules of the syllogism, and in each figure of the syllogism we leave only those combinations that correspond to the rules of the syllogism, then we get 19 modes of the syllogism, distributed among the figures in the following way:

The first figure has modes: *AAA , EAE, A, E IO,*

The second figure has modes: *E A E, A EE, E IO, AOO.*

The third figure has the modes: *AAI, IA I, A EE, EAO, OAO, E IO .*

The fourth figure has the modes: *AAI, AEE, IAI, EAO, E IO .*

In each combination (mode), as already stated above, the first letter denotes the major premise, the second—the minor, the third— the conclusion [1] . Let us give examples of some modes.

The first mode of the first figure — *AAA* —can be as follows: "all metals are simple bodies (*A*); iron is a metal (*A*); therefore, iron is a simple body (*A*)."

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[1] To make it easier to remember the modes of all figures, a special mnemonic Latin poem was composed in the Middle Ages:

Bárbara, Celarént, Daril, Fertoque prioris;
Césarè, Camestrés, Festinö, Barôko, secundae;
tertia, Darapti, Disamis, Datisi, Felâpton;
Bocardo, Ferisôn habet, quarta insuper àddit
Bràmantip, Camenés, Dimaris, Fesaro, Fresison.

The words of this poem are meaningless and untranslatable in themselves. Their meaning is that the vowels of the words printed in italics denote the modes of the corresponding figures. The first line indicates the modes of the first figure, the second line the modes of the second figure, the third and fourth lines denote the modes of the third figure, and the fifth line the modes of the fourth figure.

The third mode of the first figure *A II*: the major premise is a general affirmative proposition, the minor premise is a particular affirmative proposition, and the conclusion is a particular affirmative proposition. Example: “all athletes strengthen their bodies by training (*A*); some university students are athletes (*I*); therefore, some university students strengthen their bodies by training (*I*).”

The first mode of the third figure of *AAI*: “all whales are mammals; all whales live in water; therefore, some animals that live in water are mammals.”

In logic, it has become established that the modes of each figure are named by the corresponding word in the poem:

First figure
Barbara (*AAA*)
Celarent (*EAE*)
Darii (*AII*)
Ferio (*E IO*)

Second figure
Cesare (*EAE*)
Camestres (*AEE*)
Festino (*E1O*)
Baroko (AOO)

The third figure
Darapti (*AAI*)
Disamis (*IAI*)
Datisi (*AII*)
Felapton (*EAO*)
Bocardo (*OJSC*)
Ferison (*EIO)*

Fourth figure
Bramantip (*AAI*)
Camenes (*AEE*)
Dimaris (*IAI)*
Fesaro (*EAO*)
Fresison (*E IO*)

This whole system of designating the modes of syllogism bears the clear imprint of scholasticism, and should not be given special significance. But we still cite this system, since in logical studies the designation of the modes of syllogism by the corresponding words from the mnemonic poem mentioned above has taken root.

What are the purposes of these modes, what is their significance? When we apply a syllogism, and we do this constantly, the conclusion usually follows with certainty from the premises, and we are convinced of the correctness of our conclusion by the meaning of the inference itself. But there may be complex cases of syllogism, when the connection of the premises and the content of the conclusion following from them require analysis. In these cases, one should proceed as follows. First of all, one should determine the figure of the syllogism. This is not difficult to do by the position of the middle term — see which term is repeated in both premises and what position (subject or predicate) it occupies in the major premise and in the minor premise. Then one should determine which judgment (from among *A, E, I* and *O*) is the major premise and the minor premise. We will get the first two letters of the mode. After this, one should find the corresponding mode in the list of modes of the given figure, and we will unmistakably know whether a conclusion can be made and what it should be. Let us give examples. Sometimes we can encounter such reasoning. Every scientist must constantly work in his scientific field, improve and update his scientific knowledge, but a practical worker cannot be required to engage in science, conduct theoretical research. Let scientists and theorists engage in science, and for practitioners (business executives, administrative workers, lawyers, etc.) their practical experience is enough, they have no time to engage in science, and there is no need.

Of course, this reasoning is flawed, incorrect, and it is not difficult to refute, in essence, by pointing to the importance of theory for practice, to the fact that a practical worker who does not possess theoretical knowledge will not be able to correctly resolve the practical issues that he encounters in his work, etc.

But let us consider this reasoning from the logical side. It is not difficult to discern the following syllogism in it: “scientists are obliged to engage in science (major premise); practical workers are not scientists (minor premise), therefore practical workers are not obliged to engage in science (conclusion).” Let us define the figure of this syllogism. Obviously, this is the first figure, since the middle term “scientists” is the subject in the major premise and the predicate in the minor. Now let us look for the mode of this syllogism. The major premise here is the general affirmative judgment *A* “all scientists must engage in science”; the minor premise is the general negative judgment *E* “practical workers are not scientists”; the conclusion is also a general negative judgment *E* “practical workers are not obliged to engage in science.” This means that we have the mode *AEE*. Now let us look at the modes of the first figure in the list given above and see that the first figure does not have such a mode, it has the modes *AAA, EAE, A II, E IO*, but there is no mode *AEE*. Consequently, the entire syllogism is constructed incorrectly; it is impossible to draw a conclusion from the given premises. It is also easy to discover what exactly is incorrect about this syllogism: the major term “people obliged to engage in science”, which is the predicate in the major premise, is not distributed (as in an affirmative judgment), but in the conclusion, in which it is also the predicate, it is distributed (as in a negative judgment). This is a violation of the third rule of syllogism, according to which a term that is not distributed in the premises cannot be distributed in the conclusion.

Another example. We are given the premises: “all whales live in water; all whales are mammals.” Here it is not clear which premise is major and which minor; both premises are general judgments, and of the same generality. It is also not immediately clear what conclusion can be drawn from these premises. First of all, let us establish that this is a syllogism of the third figure, since the middle term, i.e., the concept present in both premises, “whales,” is the subject in them. Further, both premises are general affirmative judgments *A* . On this basis, we establish that this is the first mode of the third figure *AAI* ; consequently, the conclusion in it will be a particular affirmative judgment.

Obviously, this syllogism can be constructed as follows:

All whales (*M*) are animals that live in water (*P*).

All whales (*M*) are mammals (*S*).

Therefore, some mammals (*S*) are animals that live in water (*P*).

But this same syllogism can be constructed differently by changing the position of the premises, since each of them can be both greater and lesser:

All whales (*M*) are mammals (*P*).

All whales (M) are animals that live in water (*S*).

Therefore, some animals that live in water (*S*) are mammals (*P*).

§ 7. CHARACTERISTICS AND MEANING OF THE FIGURES OF THE SYLLOGISM

Each figure of the syllogism, according to its logical structure, has a certain meaning, a certain significance in the process of our thinking.

The first figure has the modes *AAA, EAE, A II , E IO*. If we compare all these four modes, we will see that in the first figure the major premise is always a general judgment (general affirmative or general negative), and the minor premise is always *affirmative judgment* (general affirmative or particular affirmative).

The major premise is a general affirmative or general negative judgment. This means that in the major premise something is affirmed or denied with respect to a whole class of objects. The minor premise is a general affirmative or particular affirmative judgment. This means that in it the class of objects specified in the major premise includes the entire other class specified in the minor premise, or part of it. Therefore, in the conclusion about the entire class or part of the class of objects specified in the minor premise, what was stated in the major premise about a wider class of objects will be expressed.

From here follows the very meaning, the sense of the first figure: it represents *the sub-assumption of a particular case under a general position, the solution of a particular question on the basis of a general rule*. This is evident from many of the examples given above: "all liquids are elastic; water is a liquid; therefore, water is elastic", etc.

The first figure of the syllogism is the most typical for mediated deductive reasoning: it is, so to speak, the classical form of the syllogism. It is precisely in it that what is typical of syllogistic reasoning is found — the sub-assumption of a particular case under a general position, and it is precisely in it that the application of the axiom of the syllogism is directly visible.

The first figure of the syllogism is widely used in our thinking in all those cases where we have to resolve some question on the basis of a general rule. If, for example, we analyse the action of some person in order to establish whether it deserves approval or censure, we evaluate this action from the point of view of the norms of socialist morality, we bring it under the corresponding norm of morality and draw a conclusion of an affirmative or negative nature regarding this action.

The first two modes of the first figure— *AAA* and *EAE* —are very easy to depict graphically in such diagrams (Fig. 14 and 15).

Modus *AAA* :

All metals (*M*) are simple bodies (*P*).

Iron (*S*) is a metal (*M*).

Therefore, iron (*S*) is a simple body (*P*).

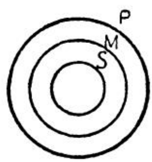


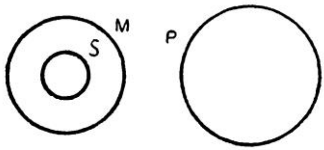
Рис. 14

In this mode, the subject (iron) is included in the middle term (metals), the middle term is included in the predicate (simple bodies), and together with it, the subject (iron) is included in the predicate (simple bodies).

Modus EAE :

No metal (*M*) is a complex body (*P*). Iron (*S*) is a metal (*M*).

Therefore, iron (*S*) is not a complex body (*P*).



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In this mode, the subject (iron) is included in the middle term (metals), the middle term is excluded from the predicate (complex body), and along with it, the subject (iron) is excluded from the predicate (complex body).

The first figure of a syllogism is of great importance in the field of jurisprudence, especially the first mode (*AAA*), which is what is sometimes called a judicial syllogism. A court’s decision in a criminal or civil case is completed by the court subsuming the fact of a crime or civil offence it has established under the relevant norm of criminal or civil law, applying this legal norm to the factual circumstances of the case under consideration, and drawing a conclusion from this norm for the given specific case. For example, a person who has caused harm to the person or property of another person must compensate the latter for the harm caused (see Civil Code of the RSFSR, Article 403); defendant N. on such-and-such a date by such-and-such an action caused property damage to citizen M. in the amount of 5 thousand rubles; consequently, these damages are recovered from defendant N. in favour of plaintiff **M.** Here the major premise of the syllogism is the general rule contained in the legal norm, in the law, the minor premise is the specific fact of the violation of the law established by the court, and the conclusion is the conclusion itself, which the court came to and which it formulated as its decision.

The second figure has the modes *EAE, A EE, E IO, AOO*. Comparing these modes, we see that in the second figure the major premise is always a general judgment (generally affirmative or generally negative), one of the premises (major or minor) is always a negative judgment, and the conclusion is also always a negative judgment. From this follows the meaning of the second figure of the syllogism: *in the conclusion of these syllogisms the objects mentioned in the minor premise are excluded from the class of objects about which the statement was made in the major premise, the belonging of the objects to this class is denied, thereby certain characteristics of these objects are denied* . For example, “all genuine works of art are ideological and close to the people; formalistic works are unprincipled (i.e. not ideological) and not close to the people (i.e. alien to them); therefore, formalistic works are not genuine works of art.” This is the mode *AEE* .

The second figure of the syllogism is widely used in disputes, discussions, and debates, when one person challenges a statement defended by another person. For example, when defending a dissertation for the degree of Doctor of Science, one opponent claims that the dissertation ‘deserves that its author be awarded a doctorate.’ The other opponent objects as follows:

‘according to the instructions of the USSR Ministry of Higher Education, a doctoral dissertation must contain a solution or theoretical generalization of scientific problems or a scientifically substantiated formulation of new problems of significant scientific interest; in this dissertation, no scientific problem is posed, but factual material is simply collected and systematized, therefore this dissertation does not meet the requirements for a dissertation for the degree of Doctor of Science.’ This is the *AEE modus* of the second figure.

The third figure has the modes *AAI, IAI, A II , EAO, OAO, E IO*. Comparing the modes of this figure, we see that in the third figure the minor premise is always an affirmative judgment (general affirmative or particular affirmative), and the conclusion is always a particular judgment (particular affirmative or particular negative). The meaning of this figure of the syllogism is that with its help *the falsity of some general statements is proven, an exception to a general rule is established, or the compatibility of concepts that at first glance may seem incompatible is indicated.*

“Cinema is a means of entertainment (*A*); cinema is a means of education (*A*); therefore, some means of education are at the same time means of entertainment (*I*).”

If, for example, someone makes the general assertion that all metals are hard, it can be refuted by the following syllogism: “mercury is not hard (*E*); mercury is a metal (*A*); therefore, some metals are not hard (*O*).” This is the third figure of the syllogism, the mode *EAO* .

The fourth figure has the modes *AAI, AEE, IAI, EAO, E IO*. Comparing these modes, it is impossible to find any features that are common to all syllogisms of this type. Of the five modes, four have a general proposition as a major premise, the fifth has a particular (particular affirmative). The minor premises in four modes are general propositions, in one a particular proposition (particular affirmative), the conclusion is particular in four modes, and in one a general and at the same time negative. An example of the fourth figure of a syllogism: “some poetic works have philosophical content (*I*); that which has philosophical content contributes to the development of a worldview (*A*); therefore, some things that contribute to the development of a worldview are poetic works (*I*).”

The fourth figure represents a very complex form of inference. Inferences in this form are rarely constructed. This is explained by the fact that in the modes of the fourth figure there is no such regularity as we saw in the first three figures.

§ 8. REDUCING THE FIGURES OF THE SYLLOGISM TO THE FIRST FIGURE

As was said above, of all four figures of the syllogism, the most typical is the first figure, in view of the fact that it clearly expresses what is characteristic of the form of deductive inference itself: inference from the general to the particular, bringing a particular case under a general rule. This figure is directly constructed in relation to the axiom of the syllogism dictum de omni. In other figures of the syllogism the sub-assumption of a particular case under a general position may not be immediately apparent, just as it may be difficult to detect the application of the axiom dictum de omni. Therefore, in logic, the reduction of all modes of the second, third and fourth figures of the syllogism to the corresponding mode of the first figure is applied.

For example, the syllogism “all planets shine by reflected light; all planets are celestial bodies; therefore, some celestial bodies shine by reflected light” represents the third figure of the syllogism, mode *AAI* .

Here we see neither the sub-assumption of a particular case under a general rule, nor the axiom dictum de omni. But this syllogism can be reconstructed in the following way: the major premise remains the same, the minor premise is subject to inversion through the restriction “some heavenly bodies (are) planets”, the conclusion remains the same. We get the syllogism: “all planets shine by reflected light; some heavenly bodies are planets; therefore, some heavenly bodies shine by reflected light”. This is the first figure of the syllogism, mode *AII*. Here we have a general rule expressed in the major premise “all planets shine by reflected light”, under which a particular case expressed in the minor premise “some heavenly bodies (are) planets” is brought under, and a conclusion is drawn from the general rule for this particular case - “some heavenly bodies shine by reflected light”.

Let us give another example. “Every genuine internationalist is a patriot who values the culture of his people; no cosmopolitan is a patriot who values the culture of his people; therefore, no cosmopolitan is a genuine internationalist.” This is the second figure, the *AEE mode*.

Let us reduce this syllogism to its first figure. Let us subject the minor premise to the simple inversion to which it is susceptible as a generally negative judgment. Then let us change the places of the premises: let us make the major premise the minor, and the minor the major. We shall obtain the syllogism: "No patriot who values the culture of his people is a cosmopolitan; every genuine internationalist is a patriot who values the culture of his people; therefore, no genuine internationalist is a cosmopolitan."

This is the first figure, the mode of *EAE*. The conclusion of this syllogism, as generally negative, we can subject to a simple reversal, so that it becomes the same as in the original syllogism of the second figure: "no cosmopolitan is a true internationalist."

Reducing the syllogisms of the second, third and fourth figures to the first figure sometimes has practical significance, making it possible to express the idea more easily and to check the correctness of the conclusion. But this reduction also has another, fundamental significance. As we know, a syllogism is an indirect deductive inference. As in a deductive inference, in a syllogism the conclusion is extracted from the premises, is deduced from them as their consequence, i.e. it extends only to those objects about which the statement in the premises was contained. It is precisely this property that is inherent in deductive inferences and distinguishes them from inductive inferences. At the same time, we pointed out that the typical form of deduction is inference from the general to the particular, and a syllogism is precisely such an inference—subsuming a particular case under a general position .

There is no contradiction between these two properties of the syllogism; one is connected with the other. Indeed, in a syllogism the conclusion is drawn from two premises and relates only to those objects about which the statement in the premises was contained. But such a drawing of a conclusion from two premises is possible mainly under the condition that one premise is a general proposition, and the other is a particular case that is subsumed under this general proposition. This is the essence of the axiom of the syllogism dictum de omni. Thus, the second property of the syllogism follows from the first. This seems to be opposed by the fact that the sub-assumption of a particular case under a general proposition is characteristic only of the first figure of the syllogism, while in other figures such a sub-assumption may not exist, for example, in the third figure, the mode *IAI* has a particular judgment as a major premise. Of course, the various modes of the second, third and fourth figures may not directly represent the sub-assumption of a particular case under a general proposition, but they can all be reduced to the first figure, which represents precisely such a sub-assumption, which, in accordance with the axiom dictum de omni and determines the conclusion from the premises.

This is the main meaning of reducing the second, third and fourth figures to the first figure: in practice, such reduction may not be carried out, but it is always possible, and, therefore, at the basis of any syllogistic inference lies the syllogism of the first figure, which is a reduction in accordance with the axiom dictum de omni of a particular case under a general position. The categorical syllogism that we have examined is the basic form of syllogistic inference. But in addition to categorical syllogisms, there are other types of syllogisms — hypothetical (conditional) and disjunctive, i.e. syllogisms whose premises include hypothetical (conditional) and disjunctive judgments. Hypothetical and disjunctive syllogisms have features, specific characteristics that distinguish them from categorical syllogisms, and rely on different foundations, obey different rules than categorical syllogisms. Let us move on to examining these types of syllogisms.

§ 9. HYPOTHETICAL (CONDITIONAL) SYLLOGISM

A hypothetical (conditional) syllogism is a syllogism in which the major premise is a hypothetical judgment. As we already know from the doctrine of judgment, every hypothetical judgment is complex, in which the connection between the subject and the predicate is made dependent on some condition.

The formula of a hypothetical judgment: if *A* is *B*, then *C* is *D*. The connection between *C* and *D* is not asserted in an unconditional form, as in a categorical judgment, but under a certain condition— if *A* is *B*.

The condition contained in a hypothetical judgment is *the basis* for the affirmation or denial of the connection between the subject and the predicate, which (i.e. the affirmation or denial of this connection) is *a consequence* following from the given basis. If *A* is *B* (the basis), then *G* is *D* (the consequence)—such is the logical structure of a hypothetical judgment (see Chapter VII , § 9).

There are two forms of hypothetical syllogism. *The first form* is:

If *A* is *B* , then *C* is *D*
A is *B*
Therefore, *G* is *D*

The major premise is a hypothetical proposition. Connection *C* with *D* is made dependent on the condition that is the basis: if A is B. The minor premise is a categorical affirmative judgment that asserts the truth of the basis specified in the major premise. The conclusion will be the judgment — *C* is *D*; it asserts the truth of the consequence that follows from the basis, the truth of which is confirmed in the minor premise.

This form of hypothetical syllogism is designated as *the positive* mode of hypothetical syllogism (Modus ponens). In this syllogism, the minor premise is an affirmative proposition, and the conclusion is also an affirmative proposition.

An example of a hypothetical syllogism of this form is: “if it rains, then the soil becomes wet; it rains; therefore, the soil becomes wet.”

Another example: “if metal is subjected to friction, it will heat up; this piece of iron has just been subjected to friction, so it is hot.”

Second hypothetical syllogism *form* :

If *A* is *B* , then *C* is *D*
C is not *D*
Therefore, *A* is not *B*.

The major premise is the same. The minor premise will be different: *C* is not *D* , i.e. a negative categorical judgment, which denies the truth of the consequence indicated in the major premise. The conclusion is *A* is not *B* ; it denies the truth of the reason indicated in the major premise.

This form of hypothetical syllogism is designated as *the negative* mode of hypothetical syllogism (Modus tollens). In this syllogism, the minor premise is a negative proposition, and the conclusion is also a negative proposition.

An example of a hypothetical syllogism of this form: "if the weather is windy, then the branches of the trees sway; now the branches of the trees are not swaying (they are motionless), therefore the weather is not windy."

Another example: "If there is acid in this liquid, the litmus paper will turn red; but the litmus paper did not turn red; therefore, there is no acid in this liquid."

The hypothetical syllogism is based on the rules of the relationship between reason and consequence.

These rules are as follows. The first rule: *if two judgments relate to each other as a basis and a consequence, then from the truth of the basis follows the truth of the consequence, and from the falsity of the consequence follows the falsity of the basis.*

The second rule: *the truth of the consequence does not imply the truth of the basis, which may be either true or false; the falsity of the basis does not imply the falsity of the consequence, which may be either false or true.*

This means the following. A hypothetical judgment consists of two judgments. One of them is the basis, the other the consequence. If *A* is *B* (the basis), then *G* is *D* (the consequence). The basis is the judgment from which another, called the consequence, necessarily follows. If we admit that the basis is true, we must also admit the truth of the consequence that follows from it.

This is evident from the hypothetical syllogism of the first form (positive method).

In the major premise, if *A* is *B*, the reason; *C* is *D*, the consequence that follows from this reason. *A* is *B*, i.e. the reason exists and is true, therefore C is B, i.e. the consequence also exists and is true. If it is true that *A* is *B* , then it is true that *C* is *D*.

For example, “if a student studies systematically and persistently, he will achieve success in his studies; Comrade N. studies systematically and persistently; therefore, he will achieve success in his studies.”

Further, if in a hypothetical judgment the consequence turns out to be false, then obviously the reason is also false. We assert that if *A* is *B* , then *G* is *D* , but in this case it turns out that *C* is not I; this obviously happened because *A* is not *B at all* , as we thought; our assertion that *A* is *B* turned out to be false, erroneous.

This is evident from the hypothetical syllogism of the second form (negative method).

“If the leaders of the Western European states wanted peace, they would not have joined the North Atlantic Pact, which is an instrument of American aggression against the USSR and the countries of people’s democracy; but the leaders of individual Western European states joined this pact; therefore, they do not want peace.”

As we see, both forms of hypothetical (conditional) syllogism have in common that their major premises are hypothetical (conditional) judgments, and their minor premises are categorical judgments (affirmative in the first form, negative in the second). Therefore, such a syllogism can also be called *a conditional-categorical* syllogism.

In constructing hypothetical syllogisms, errors of this kind are often made. We are inclined to infer the truth of the reason from the truth of the consequence, which is incorrect. If *A* is *B* , then *G* is *D,* in this case *C* is indeed *D* , and we are inclined to conclude that *A* is obviously *B*, although such a conclusion cannot be drawn. For example, "if it rained recently, then the sidewalks on the street should be wet; now the sidewalks are indeed wet." Can we conclude that it rained recently? No, we cannot, since the sidewalks may be wet not because it rained, but because the street cleaners recently watered them.

Another example: "if a person walks a lot, he gets tired." "If a person walks a lot" is the basis, "he gets tired" is the consequence. "Ivanov walked a lot" — *A* is *B*. Conclusion "Ivanov should have gotten tired" — C is *D*. This is the correct conclusion — we have deduced the truth of the consequence from the truth of the basis. Now let us see in the same example whether the truth of the basis follows from the truth of the consequence. "If a person walks a lot, he gets tired; Ivanov got tired," i.e. *C* is *D*. Can we say on this basis that Ivanov walked a lot, i.e. that *A* is *B ? No, we cannot. Ivanov could have gotten tired for another reason, and not because he walked* a lot, for example, because he worked a lot. This means that if *A* is *B* , then *C* is *D* , but if *C* is *D*, this does not mean that *A* is *B*.

Another example: "if a given body is subjected to friction, it is heated; the given body is heated." Does this mean that it is subjected to friction? Of course not, it could have been heated by other causes—by the action of sunlight or fire, by electric current, etc.

This means that the truth of the consequence does not provide grounds for asserting that the basis is also true, since this consequence could follow from another basis.

Further, we know that if the consequence is false, then the reason is necessarily false. This is evident from the second form of the hypothetical syllogism (the negative method). If *A* is *B*, then *C* is *D*, but *C* is not *D*, therefore *A* is not *B*. This is clear, examples were given above. But such a mistake is often made: from the falsity of the reason, a conclusion is drawn about the falsity of the consequence, although this is incorrect. Let us give an example: “if this metal was subjected to friction, it heated up; but this metal was not subjected to friction.” Can we conclude that this metal did not heat up? No, it cannot, because what metal could have heated up for another reason (the action of fire, electric current).

So, if the basis is false, this does not mean that the consequence is necessarily false; it may also be true, since it may follow not from this basis, but from some other.

It is not difficult to see that the hypothetical syllogism is based on the fourth fundamental law of thinking—the law of sufficient reason. In the presence of a sufficient reason formulated in the major premise, the presence of which in this case is categorically confirmed in the minor premise, will be true, and the consequence that follows from it (Modus ponens). If the consequence turns out to be false, then the judgment that served as a sufficient basis for it is also false, since a false consequence cannot result from a true basis (Modus tollens).

When examining the categorical syllogism, we pointed out that it is the basic form of syllogistic inference. This does not mean that the hypothetical syllogism is of secondary importance. On the contrary, its importance is very great, and we will encounter it again when examining induction (Chapter XI). The main importance of the hypothetical syllogism is that the conclusion is based on the relationship of reason and consequence: if it is established that two propositions relate to each other as reason and consequence, it is necessary to be convinced of the truth of the reason, and if the reason is really true, the consequence follows from it with necessity and is also true. This is the essence of the positive mode of the hypothetical syllogism. The conclusion obtained in this way will be categorical, unconditional, obligatory. A hypothetical syllogism, as we see, is called hypothetical, or conditional, not because its conclusion is presumptive, conditional—this conclusion is categorical and unconditional—but because the truth of any proposition is conditioned by another proposition, from which it follows as a consequence from the basis.

Let us give an example. In his report at the 7th Enlarged Plenum of the Executive Committee of the Communist International in 1926, Comrade Stalin spoke about the unity of our party:

“The dictatorship of the proletariat under the rule of imperialism in other countries, when one country, only one country, has managed to break through the front of capital, the dictatorship of the proletariat under such conditions cannot exist for a single minute without the unity of the party, armed with iron discipline. Attempts to undermine the unity of the party, attempts to form a new party must be nipped in the bud if we want to preserve the dictatorship of the proletariat, if we want to build socialism.

Therefore, the task is to liquidate the opposition bloc and strengthen the unity of our party" [1] .

Thus, between the task of preserving the dictatorship of the proletariat and the task of preserving the unity of the Party there is a necessary connection, which can be expressed as follows. If we want to preserve the dictatorship of the proletariat and build socialism, we must ensure the unity of the Party and destroy the opposition bloc that seeks to undermine this unity; we must do everything to preserve the dictatorship of the proletariat and build socialism; therefore, we must ensure the unity of the Party and destroy the opposition bloc. This conclusion is constructed in the form of a hypothetical syllogism, in which the categorical assertion about the necessity of preserving the unity of the Party and destroying the opposition bloc is deduced as a consequence from the task of preserving the dictatorship of the proletariat and building socialism as its foundation.

§ 10. DISPLACEMENT SYLLOGISM

A disjunctive syllogism is a syllogism in which the major premise is a disjunctive proposition.

There are two ways of disjunctive syllogism: the first way is the way of negation by means of affirmation

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[1] *J. V. Stalin* , Soya., vol. 9, p. 149.

(Modus ponendo tollens). In a disjunctive syllogism constructed in this manner, the minor premise is an affirmative judgment, and the conclusion is a negative judgment. The formula for a disjunctive syllogism in this manner will be as follows:

A is either *B* , or *C* , or *D*
A is *B*
A is neither *C* nor *D*

A major premise is a disjunctive proposition with one subject and several predicates, and only one predicate can refer to the subject. A minor premise is A *is* B. *The* conclusion is *A* is neither *C* nor *D*.

Thus, the essence of the disjunctive syllogism constructed in this way is that the major premise establishes several possible solutions, the minor premise asserts only one of them as true, as a result of which, in the conclusion, all other solutions are rejected, denied as false. For example, "triangles are either acute-angled, or obtuse-angled, or right-angled; this triangle is obtuse-angled; therefore, it is neither acute-angled nor right-angled."

The second way is the way of affirmation by means of negation (Modus tollendo ponens). In such a syllogism the minor premise is negative and the conclusion is affirmative. The formula for such a syllogism is:

A is either *B* , or *C* , or *D*
A is neither *C* nor *D*
A is *B*

The meaning of the disjunctive syllogism constructed according to this second method is that the major premise establishes several possible solutions to the question; the minor premise excludes all solutions except one, as a result of which this last solution is affirmed in the conclusion as the only correct, true one.

Example: “When a person states a fact, he either states it correctly, or makes a mistake, or deliberately tells a lie; citizen N., describing an incident he saw, does not make a mistake and does not deliberately tell a lie; therefore, he describes it correctly.”

Another example: a fire broke out in the premises of an enterprise. We construct a large premise in the form of a disjunctive judgment: “the fire broke out either as a result of careless handling of fire, or as a result of a violation of safety regulations, or as a result of arson. As a result of the investigation, it was established that there was neither a violation of safety regulations nor arson. Consequently, the fire was a consequence of careless handling of fire on the part of someone in the premises.”

This second method of disjunctive syllogism (affirmation by means of negation) has a significantly greater cognitive value than the first method (negation by means of affirmation). In the first method, as can be seen from its formula and the examples given, the main significance is not the conclusion, but the minor premise, which affirms one or another position as true; the conclusion, strictly speaking, does not add anything to what the minor premise gives. The second method of disjunctive syllogism is much more fruitful for the knowledge of objects, phenomena, events, since it makes it possible to arrive at a correct positive solution to the question by eliminating incorrect, unconfirmed assumptions.

In order for the conclusion in a disjunctive syllogism to be correct, the disjunctive syllogism must be constructed in accordance with the following rules: 1) it is necessary that all possible cases (i.e., members of the division) be provided for in the major premise, and 2) it is necessary that they exclude each other.

If the major premise does not provide for all possible cases, the conclusion according to the second form will be incorrect. *A* is either *B*, or *C*, or *O*; *A* is neither *C* nor *D*. We can conclude that *A* is *B* only if *A* is only either *B*, or *C*, or *D* and cannot be anything else, such as *E*, *K*, *L*, *M*, etc.

If the terms of division in the major premise do not exclude each other, no conclusion is possible either by the first or by the second form. *A* is either *B*, or *C*, or *D*. But if *A* can be both *B*, and *C*, or *D*, if the fact that *A* is *B* does not exclude the fact that *A* is both *C* and *D*, no conclusion can be drawn.

§ 11. DILEMMA

A dilemma is a syllogism whose premises are hypothetical and disjunctive judgments.

The meaning of a dilemma is that we have to choose between two possible solutions and we find it difficult to choose between these two possible solutions, since each of them has its negative sides. These two possible solutions between which we have to choose are called *alternatives* , and in a dilemma we have to choose only between these alternatives, since there is no third solution to the problem. That is why in ordinary colloquial speech the word “dilemma” is used to denote a difficult situation when we hesitate in choosing between two solutions. That is why sometimes they say: “I am faced with a dilemma”, “I am faced with a dilemma”, “he does not know how to get out of the dilemma”, when they want to point out the difficulty of choosing between two situations, two solutions.

“Dilemma” is a Greek word meaning “double proposition”. If the choice is made not between two, but between three possibilities, then such a syllogism is called a trilemma (triple proposition).

There are two forms of dilemma: *constructive* , or creative, and destructive, or destructive.

In a constructive dilemma, the major premise states two conditions and two consequences that follow from them as alternatives, the minor premise states the possibility of only these two conditions; the conclusion is a disjunctive judgment. As an example, we can cite the following reasoning of a student before an exam: “If I work all night the night before the exam, I will not rest and will come to the exam tired, and if I do not work, I will not prepare for the exam; but the day before the exam I can either work or rest, therefore I will either not rest and will answer the exam tired, or I will come to the exam unprepared (i.e., in both cases I will answer poorly).” The situation is difficult, obviously caused by the fact that this student did not prepare for the exam in advance. This is a correctly constructed constructive dilemma.

The famous folk tale “Ivan Tsarevich and the Grey Wolf” tells of an inscription with the following content at the crossroads of three roads: “Whoever goes straight will be cold and hungry, and whoever goes to the right will be killed, but the horse will remain safe, and whoever goes to the left will be alive, but the horse will be killed."

This is a constructive trilemma, the conclusion of which is a disjunctive judgment: the traveller will either be in hunger and cold, or die himself, or lose his horse. All three possibilities are associated with negative consequences, but one has to choose only between them, there is no other choice.

The formula for a constructive dilemma is:

If *A* is *B* , then *A* is *L* , if same *A* There is *One* hundred *A* There is *M*
A is either *B* or *C*
Therefore, *A* is either *L* or *M*.

In order for a constructive dilemma to be constructed correctly, two conditions must be met: 1) the major premise must correctly express the connection between the basis and the consequence, 2) the minor premise must exhaustively list all possible solutions to the question, all alternatives.

We often encounter dilemmas in our daily lives. When we find ourselves in a difficult situation, we look for a way out, mentally weigh all the possibilities, figure out what will happen if we solve the problem in a certain way, and what will happen if we solve the problem differently. This mental work takes the form of a dilemma, a trilemma, or an even more complex conclusion, in which we have to choose not between two or three, but between many possibilities. But it happens that we ourselves put ourselves in an apparently hopeless situation, racking our brains over which solution should be chosen from those solutions, each of which entails negative consequences, whereas in reality there is some other solution that did not occur to us, but which would provide a completely acceptable and correct way out of the situation.

A constructive dilemma can have serious cognitive significance in science, when criticizing false, unscientific views and theories. Authors of false, unscientific views constantly find themselves in a dilemma from which there is no way out, since every possible solution to the question posed on the basis of their initial positions leads to such conclusions that show the falsity of the view itself, the theory itself.

Let us give an example. In his article "On Authority" (1873), Engels refutes the views of some people who call themselves socialists, who deny authority, leadership, and submission to obligatory rules. Engels shows that without an authority that establishes obligatory work schedules, no industrial enterprise can operate. Anti-authoritarians, on the other hand, demand that immediately after the victory of the social revolution, all authority, all power, be abolished. Engels points out that "revolution is undoubtedly the most authoritarian thing possible." The party that wins the revolution must rely on force in order not to lose the fruits of its efforts. "If the Paris Commune," Engels continues, "had not relied on the authority of the armed people against the bourgeoisie, would it have lasted longer than one day? Have we not the right, on the contrary, to blame the Commune for making too little use of this authority?" Engels concludes his criticism of the anti-authoritarian view with the following conclusion: "So, one of two things: either the anti-authoritarians themselves do not know what they are talking about, in which case they are only sowing confusion, or they know it, in which case they are betraying the movement of the proletariat. In either case they serve reaction"[1].

This is an impeccably correct and absolutely irrefutable constructive dilemma, which, in relation to the above-mentioned scheme, can be expressed thus: "If the anti-authoritarians do not know what they are saying, then they are sowing confusion, but if they know what they are saying, they are betraying the movement of the proletariat; but they either know what they are saying or do not know what they are saying, therefore they are either sowing confusion or betraying the movement of the proletariat," and from this position the conclusion is drawn: "since all who sow confusion in the movement of the proletariat or betray it serve reaction, then the anti-authoritarians also serve reaction."

In this case, as in all cases of studying social phenomena, the significance of formally logical conclusions in their relationship with dialectics is evident. Of course, Engels arrived at the conclusions deposed in the article "On Authority" not by means of a formally logical scheme, but by means of applying the dialectical method to the study of social phenomena. But the conclusion he obtained took the form of a logically coherent conclusion, a dilemma from which the supporters of the view he criticized have no way of getting out unless they renounce their false starting position.

Let us give another example of a constructive dilemma from the discussions that took place at the

[1] *K. Marx* and *F. Engels*, Selected Works in Two Volumes, Vol. I, 1948, p. 591.

Danube Conference in Belgrade (July-August 1948) on the issues of navigation on the Danube.

The delegates of the USA, England and France at the conference asserted that the Danube Convention of 1921, which granted privileges to large imperialist states and violated the sovereignty and interests of the Danube countries, remained in force. In order to cancel or change this convention, these delegates of the imperialist states declared, the consent of all the countries that signed it was necessary, a number of which were not represented at the Danube Conference of 1948. The English delegation proposed referring the question of whether the 1921 Convention was currently in force to the International Court of Justice for decision. The Soviet delegation, however, argued that the 1921 Convention had lost its force, since it had been annulled by later acts and agreements of England and France, which did not apply to all the states that signed the 1921 Convention and cancelled a number of the main provisions of this Convention. At the same time, the USA and England, in clear contradiction to their own assertions that the 1921 convention is in effect and retains its force, presented their new projects: the USA — a draft of a new convention on the Danube, and England — a draft of the main provisions of the convention. As a result of such contradictory positions, the delegations of the USA and England found themselves in a dilemma, which was very clearly revealed by the head of the USSR delegation A. Ya. Vyshinsky. Let us cite the relevant passage from the speech of Comrade Vyshinsky on August 7, 1948:

“It turns out that, on the one hand, the English and American delegations offer this conference their draft conventions, which they recommend to adopt at this conference and sign, and, on the other hand, they dispute the very right of this conference to conclude a convention of this kind, deny the legitimacy of such a convention unless the conditions are fulfilled, about which the convention does not say a word... One of two things: either this conference is not authorized to sign conventions without the consent of those states that at one time signed the 1921 Convention, and in that case there is no need to offer this conference their draft conventions for approval and signature by those states that participate in the present conference; or this conference is authorized to sign a new convention, and this is really so, in that case one cannot claim that it is necessary to ask someone else's consent, besides the participants in this conference, and that if this is disputed, then it is necessary to appeal to the International Court and obtain its decision on this matter. One of two things: either, or" [1].

The inevitability of this dilemma is due to the fact that the alternatives contained in it are based on the law of the excluded middle as contradictory judgments between which there is no third, no middle ground: the conference is either really authorized to adopt a new convention, or it is not authorised—one of these two decisions is true, the other is false, tertium non datur (there is no third option). But the representatives of the imperialist countries are not embarrassed by the obvious logical contradiction of their positions: since the issue is about defending the interests of imperialist predators at the expense of the interests of democratic countries, logic can be sacrificed very easily.

[1] Izvestia, August 10, 1948.

The way out of this dilemma is this: it is only necessary to accept the alternative that is true — that the conference is empowered to adopt a new convention concerning navigation on the Danube. This is the decision that the conference has reached, despite the objections of the imperialists.

Another type of dilemma is the destructive dilemma. *A destructive dilemma is one in which the major premise indicates that one of two consequences can follow from one reason; the minor premise denies both of these consequences; and the conclusion denies the reason itself*.

Unlike the constructive dilemma, which we have already become familiar with, the conclusion of *a destructive dilemma is not a disjunctive judgment, but a categorical judgment, but necessarily negative, not affirmative*. This means the following: the major premise contains the assertion that if this or that thing exists, then this must necessarily have one of two consequences; the minor premise establishes that in this case neither of these consequences exists; the conclusion will be the judgment that this thing does not exist (i.e., a denial of its existence).

Example: "if a conscientious worker makes a mistake in his work and notices it, he will either correct it himself or report it; this worker, having made a mistake and discovered it, did not correct it and did not report it (i.e., hid it), therefore he is not a conscientious worker."

This dilemma is based on the same position as the negative method of the conditional syllogism: from the falsity of the consequence (here, two consequences) follows the falsity of the basis.

The destructive dilemma can be expressed by the following formula:

If *A* is *B* , then *A* is either *C* or *D*
But *A* is neither *C* nor *D*.
A is not *B*

In relation to a destructive dilemma (as in relation to a constructive one), it is necessary that the alternatives contained in this dilemma exhaust all possible solutions to the problem. If this is not the case, i.e. if the dilemma does not provide all possible solutions to the problem, but only some of them, the destructive dilemma will be incorrect, and the conclusion will be erroneous. Let us give an example. Let us assume that someone has committed some offense, an omission, for which he will have to bear responsibility. The person who has committed an omission sometimes reasons in this way: “if my friend, who knows about what happened to me, really loves me, then he will either hide my guilt or help me justify myself; but my friend in this case has not hidden my guilt and is not helping me justify myself, therefore he does not love me, he is not my friend.” What is the mistake here? Here, only two possible consequences of friendship are taken, and they are precisely the wrong ones: either he will hide the guilt or help me justify myself. But there is another possible consequence: a true friend will advise his friend to honestly admit and make amends, which is what he did in this case. This third, the only correct consequence, is missing in this dilemma, and therefore the conclusion drawn is wrong.

§ 12. ENTIMEME

As we already know, a categorical syllogism consists of three parts: a major premise, a minor premise, and a conclusion. But in our everyday thinking we do not always use such a complete syllogism, but often shorten it in such a way that one or another part of the syllogism is not stated, but only implied.

An enthymeme is an incomplete categorical syllogism, i.e. a syllogism in which either the major premise, or the minor premise, or the conclusion is missing.

Thus, there are three types of enthymeme: 1) the major premise may be omitted, there are only the minor premise and the conclusion, 2) the minor premise may be omitted, there are only the major premise and the conclusion, and 3) the conclusion may be omitted, there are only the major and minor premises.

Let us give some examples. The first type of enthymeme, in which the major premise is missing: “a merciless struggle must be waged against cosmopolitanism, since cosmopolitanism is the ideology of imperialist reaction.” Here the major premise is missing, but implied: “a merciless struggle must be waged against the ideology of imperialist reaction.”

The second type of enthymeme: “every gas is compressible; therefore, air is compressible.” The minor premise is missing here: “air is a gas.”

The third type of enthymeme: “liars cannot be trusted, and Ivanov is a liar.” The conclusion is missing: “therefore Ivanov cannot be trusted.” Here is another example of the third type of enthymeme from the comedy “Woe from Wit” by *A.S. Griboyedov*: “Ranks are given by people, but people can be deceived" (Chatsky's words, spoken to Molchalin). The conclusion is missing here, but implied: "ranks can be given incorrectly, erroneously."

Thus, an enthymeme is an abbreviated syllogism, without any of its legitimate elements. The enthymeme is constantly used in scientific and practical thinking. Usually in our inferences we resort more often to the enthymeme than to the full, expanded syllogism. However, the enthymeme conceals a great danger: it is more difficult to notice an error in the enthymeme than in the construction of a full syllogism. In a full syllogism, an error can easily be detected, because in it the major premise, the minor premise and the conclusion are formulated. When we have an enthymeme, i.e. a syllogism without any of its elements, it is quite possible that in the part of the syllogism that is omitted there is an error, and we did not notice it, because we did not directly express the judgment.

For example, sometimes people reason like this: "This person made a mistake in his work, therefore he cannot be relied upon, he cannot be trusted." Such reasoning may seem convincing. This is an enthymeme in which the major premise is missing. Let us restore it: "Any person who has made a mistake in his work even once is not trustworthy." As soon as this major premise is formulated in this way, its incorrectness immediately becomes obvious. Mistakes in work can be different. Some of them can really undermine trust in the person who made them, while others can be the result of insufficient experience, or be of an accidental nature, or can be associated with attempts to resolve a new, unexplored issue, etc.

§ 13. EPICHEREM

An epicheirema is a syllogism in which each of the premises is an enthymeme.

Let's give an example.

"Those who conduct war propaganda deserve criminal punishment, since war propaganda is a call to commit a crime.

The leaders of a number of reactionary newspapers in imperialist states are conducting propaganda for war, as they call for the use of armed violence and destructive means (atomic bombs) against peace-loving democratic countries.

Consequently, the leaders of a number of reactionary newspapers of imperialist states deserve criminal punishment."

This is an epicheirema in which the major and minor premises are abbreviated syllogisms, i.e. enthymemes.

The major premise of this epicheirema is expressed in the following syllogism:

"Those who call for the commission of crimes deserve criminal punishment; those who propagate war call for the commission of crimes, therefore those who propagate war deserve criminal punishment."

In the same way, the minor premise of the above epicheirema is expressed as follows:

"The call for the use of armed violence and destructive means against peace-loving democratic states is propaganda of war; the leaders of a number of reactionary newspapers in imperialist states call for the use of armed violence and destructive means against peace-loving democratic countries, therefore the leaders of a number of reactionary newspapers in imperialist states are conducting propaganda of war."

We will make the conclusion of the first and second syllogisms the major and minor premises of the following syllogism:

"Those who conduct war propaganda deserve criminal punishment; the leaders of a number of reactionary newspapers in imperialist states conduct war propaganda, therefore the leaders of a number of reactionary newspapers in imperialist states deserve criminal punishment."

All this reasoning can be expressed in a shortened form in the form of one conclusion — epicheirema.

§ 14. POLYSYLLOGISM

A polysyllogism is a combination or concatenation of several syllogisms in such a way that the conclusion of one syllogism becomes the premise of another syllogism.

Thus, polysyllogism is a complex syllogism. There are two ways of polysyllogism.

The first method *is progressive polysyllogism*; in it, the conclusion goes from the more general to the less general. The second method is regressive polysyllogism; in it, the conclusion goes from the less general to the more general.

Let us give an example of the first method—a progressive polysyllogism. Major premise: "everything that increases knowledge is useful." Minor premise: "science increases knowledge." Conclusion: "science is useful." Let us make the conclusion of this syllogism the major premise of the next syllogism: “every science is useful; mathematics is a science; therefore, mathematics is useful.” Let us again make this conclusion the major premise of a new syllogism: “mathematics is useful; geometry is a part of mathematics; therefore, geometry is useful.”

Here is an example of the second method—regressive polysyllogism. Let us take the same example in reverse order: “geometry is a part of mathematics; mathematics is a science; therefore, geometry is a science”; “geometry is a science; science increases knowledge; therefore, geometry increases knowledge”; further, “everything that increases knowledge is useful; geometry increases knowledge; therefore, geometry is useful.”

The practical significance of polysyllogism is as follows. We express our thoughts in judgments. In conclusions, we connect individual thoughts and derive new thoughts from them. But when we derive a new thought and express it in a new judgment, we do not stop there, but develop this thought further, connect it with other thoughts. We often act like this: the conclusion we arrived at in one conclusion, we make the premise of the next conclusion and, thus, continue the development of our thought.

A special type of polysyllogism is the so-called “soritis”. *A sorites is a polysyllogism in which only the final conclusion is given, carried out through a series of premises; all other intermediate conclusions are not stated, but implied.* The formula of a sorites can be given as follows:

A is *B*
B is *C*
C is *D*
D is *E*
Therefore , *A* is *E*.

We can demonstrate sorites using the same example given above. If we throw out all the intermediate conclusions and leave only the last conclusion, which we will carry out through all the premises, we will get sorites: "everything that increases knowledge is useful; science increases knowledge; mathematics is a science; geometry is a part of mathematics; therefore, geometry is useful."

The significance of this form of complex reasoning is that by linking several premises with each other, by adding to each premise the next premise connected with it, we arrive at a conclusion that necessarily follows from the connection of all these premises. Let us give an example. In the article "The Class of Proletarians and the Party of Proletarians" (1905), devoted to the discussion at the Second Congress of the RSDLP of the question of the first point of the party charter, Comrade Stalin, having examined the conditions necessary for membership in the party, wrote:

"This means that in order to become a member of the party it is necessary to implement the program, tactics and organizational views of the party; in order to implement the views of the party it is necessary to fight for these views; in order to fight for these views it is necessary to work in the party organization and work together with the party. It is clear that in order to become a member of the party it is necessary to join one of the party organizations . "[1]

§ 15. PARALOGISMS AND SOPHISMS

Every syllogism is a very important form of inference, if only the syllogism is constructed correctly. But syllogisms can be erroneous, incorrect. The correctness of every syllogism depends on two conditions: 1) on the truth of the premises of the syllogism and 2) on the logical sequence, connection, and consistency of all parts of the syllogism. The conclusion of the syllogism will be true if the premises are true and if the conclusion actually follows from these premises according to the rules of the syllogism.

Above we examined in detail the rules of syllogism and the errors that are sometimes made in syllogisms due to violation of these rules.

An incorrect syllogism in logic is called a *paralogism*. If an incorrect syllogism is constructed intentionally incorrectly in order to confuse your opponent in an argument or for the sake of playing with words, then such a syllogism is called *a sophism*.

The concept of "sophism" also has a broader meaning—any deliberately incorrect conclusion (and not just a syllogism), any logical intricacy, trick, rigged arguments, artificially made false conclusions.

Sophisms are widespread in the writings of bourgeois theorists and in the everyday life of bourgeois politicians and are used when it is necessary to conceal

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[1] J. V. Stalin, Works, Vol. 1, p. 66.

the class essence of the bourgeois state and social system by various intricacies and tricks, to conceal the true intentions and appetites of the reactionary imperialist cliques that are in charge in various capitalist countries. For example, the arguments of many bourgeois politicians who objected to the adoption of effective measures to combat propaganda and the fomenting of a new war under the pretext that such measures would mean a violation of “freedom of speech” are sophistries (see the reports of the 2nd session of the General Assembly of the United Nations in October-November 1947).

The arguments of those opposed to the prohibition of war propaganda are expressed in the form of the following syllogism:

“Free expression of one’s opinions and convictions is the exercise of freedom of speech; propaganda of war is the free expression of one’s opinions and convictions, therefore propaganda of war is the exercise of freedom of speech.” And from this, in turn, the conclusion is drawn that propaganda of war cannot be prohibited.

This whole argument is a sophism of the most disgusting nature. At the basis of this argument lie the predatory desires of the imperialists who are preparing a war against the states of the anti-imperialist and democratic camp. It is for this purpose that such a cunning interweaving was invented. But in fact, this argument is false from the logical point of view, since it deliberately allows for a quadrupling of terms (quaternion terminorum). Indeed, the middle term in the major premise means free expression of one’s thoughts and convictions in the interests of society, but not in any way an expression that contains a call to commit crimes. And in the minor premise, the middle term is interpreted in precisely this sense — an expression of anything, including a call to commit crimes.

§ 16. THE MEANING OF SYLLOGISM

In our everyday thinking, both scientific and practical, the syllogism plays a major role. When we bring some particular case under a general rule and draw a conclusion from the general rule regarding some fact, we use the form of a syllogism, and our reasoning is subject to the rules of the syllogism that were set out above. The complexity of the question of the role of the syllogism in our thinking lies in the fact that psychologically our thinking does not necessarily proceed in the form of a syllogism and, in fact, our reasoning is far from always expressed in the fact that we construct syllogisms and one syllogism is connected with another. In our thinking, we do not always proceed from a general position and, proceeding from it, draw a conclusion about a specific fact. Usually our reasoning on various issues begins with a specific fact, so that if we take some course of reasoning, some segment of the thinking process on some specific issue, for example, read an excerpt from a book, we will not always find the general rule, the particular case and the conclusion disaggregated.

But we know that logic, unlike psychology, does not study the process of thinking itself, as it actually takes place in our consciousness—logic studies the laws that govern correct thinking. Our reasoning may not have the form of a syllogism and often does not, but if we want to check the correctness of our reasoning, want to make sure whether our conclusion is logically justified, we give our reasoning a syllogistic form.

The actual course of thought in the argument may not coincide with the structure of the syllogism, but in cases where doubt arises about the correctness of the conclusion, the inference should be given the form of a syllogism, and then, if an error has been made, it will be easily discovered.

Bourgeois logicians often underestimated the syllogism, diminished its role and significance. This is typical of English logicians of the 19th century, representatives of that idealistic trend in bourgeois philosophy which is called positivism.

Two objections were usually raised against the syllogism.

The first objection is this: in fact, people do not always think in the form of syllogisms; psychologically, the process of thinking does not proceed in the form of establishing a general rule, subsuming a particular case under it, and drawing a conclusion. This objection is untenable and is based on a confusion of logical and psychological points of view. Logic does not study all actually occurring thinking as a natural process, but only correct thinking and its laws.

The second objection is this: there can be nothing in the conclusion of a syllogism that was not in the major and minor premises; therefore the conclusion of a syllogism cannot add anything to what was already in the premises, therefore a syllogism does not extend knowledge about the objects expressed in the premises.

And this objection cannot serve as an argument against the meaning of the syllogism.

Although the conclusion of a syllogism can only deal with those things that have already been said in the major and minor premises, thanks to the form of the syllogism, something new is established in the conclusion that was not known in the premises.

Indeed, in the major premise the connection between *S* and *M is known*, in the minor premise the connection between *S* and *M is known*, but in the premises the connection between *S* and *P is not yet known*. A syllogism makes it possible to establish a previously unknown connection between two concepts expressing different objects, based on their known connection with a third concept. Thus, in the conclusion of a syllogism we learn *a new* connection between two objects previously known to us. This is the meaning of a syllogism.

The denial by many English logicians of the significance of the syllogism means a denial of the objective significance and reliability of the conclusions that express the connections between the phenomena of objective reality.

A syllogism is especially important in cases where we are considering a question and are at a loss as to what conclusion to come to. We will be able to draw the correct conclusion in a given case if we find the corresponding general rule and are convinced that the given case fits this rule. When considering various particular cases—facts, objects, events—it is far from always easy to find the general position to which the given case relates, and very difficult mental work is sometimes required to be convinced that it is precisely this general position (for example, a law of nature, a law of social development, or another position of a theoretical or practical nature), and not some other, that provides for the given particular case. A great deal of mental work is sometimes required to draw a conclusion that actually follows from the given general position for the particular case under consideration. Therefore, very often we can be convinced of the correctness of the conclusion only when we have constructed a syllogism. Therefore, a syllogism is of undoubted importance for understanding objective reality.

§ 17. ON THE SO-CALLED "NON-SYLLOGISTIC INFERENCES"

In concluding our consideration of the syllogism, we must dwell on one controversial issue of formal logic, to which various solutions are given in logical studies.

The syllogism, which we examined above, is a mediated deductive inference. The question has long been raised in logic as to whether mediated inferences are exhausted by the syllogism or whether there are other forms of inference besides the syllogism. Non-syllogistic mediated inferences are *inductive* inferences, which will be discussed in detail in the following presentation. But the question did not arise about them; the issue is whether there are special "non-syllogistic inferences" in logic besides inductive ones. In a number of works on logic, the idea was expressed about the existence of a special group of mediated "non-syllogistic inferences," i.e., inferences that are neither inductive nor syllogistic. Such inferences are considered as independent inferences, standing between deduction and induction, not belonging to either one.

This view is based on the recognition of the existence of a special kind of "judgments of relation" that cannot be reduced to judgments of inclusion of a subject in the class of a predicate or attribution of predicate attributes to a subject, which was detailed in this book (Chapter VII). If there is a special kind of "judgment of relation", then there is also a special kind of inferences whose premises consist of such "relational judgments". Such inferences, for example, would be the following: A = B, B = *C,* therefore A = *C; A is greater than B, B* more *C,* therefore *A* more *C*. *"*Lermontov died before Berlin. Belinsky died before Gogol"; "point *A is to the left of* point *B,* point *B* to the left of point *C,* therefore point *A* to the left of point *C"*; "Ivan is Peter's father, Peter is Semyon's father, therefore Ivan is Semyon's grandfather", etc., etc. Are such inferences really a special kind of inference, different from syllogistic ones, or are they also syllogistic inferences?

The recognition of such inferences as a special type of my inferences, namely, "non-syllogistic inferences", runs up against the same insurmountable obstacle that stands in the way of constructing a special type of "judgments of relation", and which we have already discussed in detail. We cannot recognize the existence of a special type of "judgments of relation" because the very concept of relation, which supposedly characterizes this type of judgment, is devoid of any definiteness and denotes both the relation of causality, and the relation of objects in space, and the relation of kinship, and the relation of love, and the relation of temporal sequence, etc., etc. As we have already pointed out, such “judgments of relation” are nothing more than an ordinary logical judgment, in which the class of the subject is included in the class of the predicate or excluded from it, and the content (features) of the predicate is attributed to the subject or denied to it. On the same basis, it must be recognized that there is no special type of “inferences of relation”, or “non-syllogistic inferences”. Indeed, syllogistic inference is based on a certain *logical type of relationship of concepts*, namely on the relationship that is expressed by the axiom of the syllogism dictum de omni — what is said about a whole class of objects is also said about each individual object, and nota notae — the sign of the sign of a thing is the sign of the thing itself. This is what gives the syllogism a certain logical structure. Conclusions built on the relationship of objects in time, in space, on the relationships of causality, magnitude, love, kinship, etc., do not have any single logical basis, and therefore are devoid of any certainty, and for them it is impossible to establish any logical rules, logical laws.

A closer examination of the so-called “non-syllogistic inferences” reveals that they are nothing more than the usual abbreviated expression of syllogistic inferences and can always be reduced to syllogisms. Objections to the possibility of reducing them to syllogisms are usually based on the fact that only categorical syllogisms are meant and the existence of hypothetical syllogisms, which have the same right to exist and play no less a role in our thinking than categorical syllogisms, is overlooked.

Let us consider some examples of so-called “non-syllogistic inferences”.

“Point *A* is to the left of point *B*, point *B is* to the left of point *C*, therefore point *A* is to the left of point *C*.” The inference is absolutely correct, we are accustomed to such inferences, they follow from the relationships of objects known to us by their position in space. But let us ask the question, is this inference correct, let us doubt for a moment the correctness of the conclusion. How can it be proven? It can be proven in the following way. First of all, we formulate a general rule: “if point *B is* to the left of point *C*, then all points lying to the left *of B* will also be to the left *of C*.” This is correct, but this statement is based not on any logical laws, but on our knowledge of the relationships of objects in space. This statement is correct in the same way as the statement that the sum of the angles of a triangle is equal to two right angles, that if bodies are subjected to friction they heat up, and if a gas is heated it expands, etc. We have expressed this rule in the form of a hypothetical judgment: “if point B is located to the left of point *C*, then all points located to the left of *B* will also be located to the left *of C*.” Let us make this judgment the major premise of the hypothetical syllogism. In this case, point B is indeed located to the left of point *C* — this is evident from their position in relation to each other. Let us make this last categorical judgment the minor premise of the hypothetical syllogism; it, as is evident, asserts the truth of the basis of the major premise. Then we will obtain the conclusion—consequently, all points located to the left of B will also be to the left of *C*, i.e., the conclusion will assert the truth of the consequence of the major premise, as it should be according to the rules of the positive mode of the hypothetical syllogism (Modus ponens).

Our syllogism will look like this:

"If point B *is* to the left of point *C*, then all points located to the left of point *B* will also be to the left of point C. Point B is to the left of point C. Therefore, all points located to the left of point *B* will be located to the left of point *C*."

We will make the conclusion of this hypothetical syllogism the major premise of the following categorical syllogism:

"All points located to the left of point *B* are also located to the left of point *C*. Point *A* is located to the left of point *B*. Therefore, point *A* is located to the left of point *C*." Which is what had to be proved. The last syllogism is the first figure, mode *AAA* .

Let us take another example: "Cervantes was a contemporary of Bacon, Bacon was a contemporary of Shakespeare, therefore Cervantes was a contemporary of Shakespeare." The conclusion is correct, we are satisfied with it. But suppose that someone doubts this, how can we prove the correctness of our conclusion? We will reason as follows .

"If Bacon was a contemporary of Shakespeare, then all men who are contemporaries of Bacon are also contemporaries of Shakespeare. Bacon was a contemporary of Shakespeare. Therefore all men who are contemporaries of Bacon are also contemporaries of Shakespeare.

Cervantes is a man who is a contemporary of Bacon.

Therefore, Cervantes is a contemporary of Shakespeare."

Now let us take two premises expressing such relations between objects in which the relation between object *A* and object *B* is different from the relation between object *B* and object *C*. Let us say this:

“Ivan is Peter’s friend, Peter is Semyon’s friend.” Can we conclude that Ivan is Semyon’s friend? Obviously, we cannot, because if we construct a hypothetical syllogism, as we did before, then its major premise will be an incorrect, false judgment. This premise will look like this: “if Peter is Semyon’s friend, then all of Peter’s friends are Semyon’s friends.” This is incorrect, incorrect not from a formal logical point of view, but in essence, since it incorrectly expresses the actual relations between people, and therefore both the hypothetical and categorical syllogisms that follow from this judgment will be incorrect [1] .

For all the reasons stated, we come to the conclusion that there are no grounds for constructing a special type of “non-syllogistic inferences”. Deductive inferences, as we have seen, are direct and mediated. Mediated deductive inferences are syllogisms. In addition to deductive inferences, there are inductive inferences, which are truly not syllogistic and which will be discussed in detail below.

It may seem that this point of view, according to which all inferences are divided into deductive and inductive, contradicts the statement of Engels. Considering the views of Haeckel and others on the relationship between deduction and induction, Engels

[1] There is a famous French aphorism: “The friends of our friends are our friends” (Des amis de nose amis sont nose amis). Of course, this is only a figurative expression, and not a general rule. But if we give it the meaning of a general rule, then the given example will be formally correct, as will the supposedly non-syllogistic inference that replaces it: "Ivan is Peter's friend, Peter is Semyon's friend, therefore Ivan is Semyon's friend."

wrote: “These people are so bogged down in the opposition between induction and deduction that they reduce all logical forms of inference to these two, completely failing to notice that they 1) unconsciously use completely different forms of inference under this name, 2) deprive themselves of the whole wealth of forms of inference, since they cannot be squeezed into the framework of these two forms, and 3) as a result transform these forms themselves — induction and deduction — into pure nonsense”[1] . Do these words of Engels provide grounds for introducing, along with deductive and inductive inferences, another new kind of inference — non-syllogistic? When one becomes fully acquainted with Engels’ thoughts on the classification of judgments, it becomes quite clear that Engels here considers the theory of judgments and inferences from the point of view of dialectical logic, and not formal logic. The passage “On the Classification of Judgments”, which contains the above quotation, begins as follows: “Dialectical logic, in contrast to the old, purely formal logic, is not content with listing and placing side by side without any connection the forms of the movement of thought, i.e., the various forms of judgments and inferences. On the contrary, it derives these forms from one another, establishes between them a relationship of subordination, and not coordination, it develops higher forms from lower ones”[2]. It is precisely from the point of view of dialectical logic that Engels quite reasonably pointed out that the entire wealth of forms of inferences is not covered by deduction and induction; dialectical thinking is richer and more varied.

It is absolutely unthinkable to imagine that if we were to add "non-syllogistic inferences" to deductive and inductive reasoning, we would thereby exhaust the entire wealth of forms of reasoning that Engels spoke of. This wealth of forms of reasoning can only be encompassed by dialectical logic, but formal logic does not and cannot set itself such a task; within the boundaries of its sphere, it does not have other forms of reasoning besides deductive and inductive ones, and for its purposes these forms are quite sufficient.

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The syllogism we have considered in this chapter, i.e., mediated deductive inference, is a logical operation by means of which we, from the judgments we have available and given to us, connect them and draw the conclusion that follows from them. This means that in order to make a syllogistic inference, one must have ready-made premises. This is a necessary condition of any deductive inference. Furthermore, the conclusion of a syllogism contains a statement only about those objects about which statements were contained in the premises. This is another necessary condition of deductive inference. Both of these conditions limit thinking by means of deduction to a certain sphere. But thinking is not limited to this sphere, and deductive forms of inference do not exhaust the tasks of thinking. In a syllogism, the general proposition, which serves as the major premise, and the particular case, which is the minor premise, are given in ready-made form, but before we receive these premises in this form, they

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[2] Ibid., p. 179.
[1] *F. Engels*, Dialectics of Nature, p. 181.

themselves must be formed, established. For this purpose, deduction alone is usually not enough. For this purpose, it is necessary to turn to the study of the objects themselves as they exist in reality; it is necessary to collect and study various factual material empirically.

The study of the facts, objects, and phenomena of reality is achieved by various methods, the application of which goes beyond deduction. Furthermore, in our thinking, aimed at understanding objective reality, we are far from always satisfied with the combination of thoughts and the deduction of the consequences contained in them. To study objective reality, it is necessary to examine individual objects, facts, and phenomena, to move from facts known to us to unknown facts, to extend the knowledge obtained about some facts and phenomena to all similar facts and phenomena, to generalize individual facts and phenomena, to move from individual facts and phenomena to generalizing conclusions. This task is served by another type of inference, different from deduction — *inductive inferences.*

Chapter XI . INDUCTION

1. The concept of induction. 2. Observation, testimony and experiment. 3. Induction through simple enumeration. 4. Scientific induction. 5. Causal connection of phenomena, b. Logical methods of establishing the causes of the phenomena under study. 7. Plurality of causes and mixing of effects. 8. Hypothesis. 9. Analogy. 10. The relationship between induction and deduction.

§ 1. THE CONCEPT OF INDUCTION

Induction is a type of mediated inference.

Inductive inferences are those in which the premises indicate the characteristics of individual objects and their groups, and the conclusion extends what is stated in the premises to other objects of the same kind.

Deductive inferences, which we have discussed in detail, are characterized by the fact that their conclusion cannot contain anything that was not previously given in the premises; the conclusion refers only to those objects about which something was said in the premises. This property of deduction is most clearly expressed in the third rule of syllogism, according to which a term not distributed in the premises cannot be distributed in the conclusion. This property of deductive inference is emphasised by its very name: deduction means *deduction*.

The inductive inference that we are considering now is characterized by a different property! In it, the conclusion is extended to objects other than those discussed in the premises. Therefore, inductive inference is always a conclusion from known facts, considered in the premises, to unknown facts, not considered in the premises: what we know about some objects, facts, we extend to other similar objects, facts. This property of inductive inference is emphasized by its name: induction means *guidance*, i.e., a conclusion about new, unknown objects, facts, the features of which we are "guided" by the objects, facts, studied by us, of the same kind.

Thus, in inductive reasoning, the conclusion goes *beyond the scope* of the concepts linked in the premises. The premises contain statements about a number of objects of a given class, about some of them, about many, but not about all, and the conclusion extends the features that were established in the premises only for some objects of a given class to all objects of that class.

In deductive reasoning, as we know, the conclusion can only contain those concepts that were in the premises. In the conclusion of inductive reasoning, there can also be a concept that was not in the premises.

Therefore, the conclusion of an inductive inference, unlike a deductive one, can go not only beyond the scope of the concepts taken in the premises, but also beyond the content of these concepts.

From the above follows another difference between deduction and induction: in deductive reasoning there is a strictly defined number of premises — one in direct reasoning and two in mediated reasoning, i.e., syllogism. A greater number of premises in complex syllogisms (polysyllogism sorites) does not change this position, since a complex syllogism is a combination of several syllogisms, so that each individual syllogism has only two premises. In inductive reasoning the number of premises may vary, more or less, depending on the number of studied facts from which a conclusion is made about unknown, unstudied facts of the same kind.

In deductive reasoning, if the premises are true and the reasoning itself is constructed logically correctly, the conclusion is true, reliable, and necessarily follows from the premises.

In inductive inferences, the truth of the premises and the logical correctness of the construction of the inference give only a probable conclusion. This probability may be more or less high, it may be so high that it is extremely close to certainty, but complete certainty is still not achieved in the inductive inference itself. Indeed, if induction is an inference from known facts to unknown facts, i.e., it extends information about studied facts to unstudied facts, the conclusion cannot be completely reliable, since we cannot know with complete certainty what we will encounter in unknown, unstudied facts.

The reliability of deductive inference from reliable premises is quite clear: in the conclusion we do not go beyond either the scope or the content of the concepts connected | in the premises, for example, we draw a conclusion about the characteristics of a species / based on the characteristics of the genus to which the given species belongs. In inductive inference, we go the opposite way, from premises narrower in scope we move to a broader conclusion, for example, from the characteristics of a species we draw a conclusion about the characteristics of the genus to which the given species belongs. And this determines only the probability of the conclusion, even if the premises were completely reliable. Engels pointed out that “inductive inference is essentially problematic ...”[1]

Lenin pointed out the same property of induction: “The simplest truth, obtained in the simplest, inductive way, *is always* incomplete, because experience is always unfinished. Ergo : the connection of induction with analogy—with *guesswork* (scientific foresight), the relativity of all knowledge and the absolute content in each step of knowledge forward”[2] . We will have to return to this issue in the future exposition, but for now we will only note that this position does not at all mean the unreliability of our knowledge in general, the impossibility of knowing the truth. We are only talking about the fact that induction alone does not provide grounds for completely reliable conclusions, that inductive inference *in itself* , i.e. taken in isolation, can contain in its conclusion only a more or less probable, but not completely reliable position. In order for the conclusion to be completely reliable, it is necessary to go beyond the limits of, so to speak, pure induction.

Since in inductive reasoning the conclusion extends to objects not considered in the premises, this conclusion goes beyond the premises and is, as a rule, more general in nature than the premises.

The basic method of using induction is as follows: we observe a number of objects, events, phenomena, and in the premises of the inference we establish some common essential characteristics of these objects, events, phenomena that we observed, and in the conclusion we conclude that these same characteristics are inherent in all objects of a given kind, the entire

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[1] *F. Engels*, Dialectics of Nature, p. 182.

[2] *V. I. Lenin*, Philosophical Notebooks, p. 154.

class of these objects, events, phenomena, i.e., a wider range of objects than those that were considered in the premises.

In these cases our thought moves from particular cases to general propositions. The deductive inference we have studied in its typical form is an inference *from the general to the particular*, i.e., the deduction from the general proposition of the consequence that follows from it for the particular case; the inductive inference in its typical form is an inference *from the particular to the general*, i.e., the establishment of a general proposition on the basis of a series of particular cases.

When investigating natural or social phenomena, we observe and study individual objects, facts, events, and on the basis of studying these objects, facts, events, we establish general provisions, reveal general patterns in nature, in society. Thus, induction is based on experience, on collecting, researching and generalizing facts. That is why the inclusion of induction in the system of logic as an independent section along with the section of deduction could occur when empirical, experimental knowledge had received sufficient development. But induction itself is as old as the experience of human activity, and it has always been used in human thinking.

Induction is of great importance in the natural sciences. It was through the study of various phenomena that science discovered the general laws of nature, i.e. from individual observed and emitted facts it drew general conclusions about the laws manifested in natural phenomena.

Induction occupies a large place in the social sciences, since it is by means of induction that facts and phenomena relating to various aspects of social life are collected and generalized. Induction is also important for our everyday life and practical activities.

Examples of inductive reasoning are numerous. For example, we constantly observe that the friction of a solid body causes it to heat up; as a result of observing many similar phenomena, the general conclusion is drawn that bodies heat up from friction; this conclusion extends to all cases of this kind, and not only to those which we have studied.

Thus, inductive inference is a generalizing conclusion from a series of observed, studied homogeneous phenomena relative to all phenomena of a given kind.

Usually in bourgeois logic textbooks, "complete induction" is indicated as a special type of induction.

"Complete induction" is the name given to a conclusion in which the premises establish the characteristics of a number of individual objects and phenomena, and the conclusion contains a general conclusion about the same objects and phenomena considered and does not extend to other, unconsidered facts and phenomena.

For example, each of the 12 months of the year has no more than 31 days; from this follows the general position: all months of the year have no more than 31 days. Checking all the books in the bookcase and making sure that each book is printed in Russian, one should make the general conclusion: all the books in this bookcase are Russian, there are no foreign ones.

From these examples it is easy to see that the conclusions obtained in this way can be quite reliable, but "complete induction" does not provide knowledge about unexamined objects—a conclusion of a generalizing nature is made only about those objects that were examined in the premises. “Complete induction” is only a generalizing formulation.

In “complete induction” there is no such feature that is inherent in the very concept of induction: the extension of the conclusion to objects, phenomena, not considered in the premises, the conclusion from known facts to unknown facts. Indeed, in an inference constructed according to this type, the conclusion extends only to those objects, phenomena, which were considered in the premises, the conclusion does not go beyond the premises. And from this it follows that “complete induction” is an *apparent* induction, not a genuine induction, but in fact it is a deduction.

As we know, deductive reasoning—syllogism—is based on the axiom dictum de omni: everything that is asserted about the whole class of objects is asserted about each object of this class. “Complete induction” is based on the same rule, but only, so to speak, in an inverted form: *everything that is asserted about each object of a given class, is also asserted about the entire class* . In any conclusion of this type there is an unspoken but implied major premise, asserting that the objects considered constitute the entire volume of a given concept, the entire class of these objects.

It follows that such inferences are deductive, not inductive.

In any valid inductive inference, the conclusion extends the information obtained about the observed facts and phenomena considered in the premises to other facts and phenomena of the same kind that have not yet been observed and considered in the premises. This is precisely the essence of induction.

§ 2. OBSERVATION, WITNESS AND EXPERIMENT

The necessary conditions of induction are observation, testimony and experiment.

Observation is the study of various phenomena as they occur and are accessible to the perception of the researcher. Observation differs from ordinary perception by its active and goal-oriented nature. We perceive everything that affects our senses. We observe what is significant to us, what is of scientific or practical interest to us. For example, I look at the starry sky and admire it. This is perception. I look at the starry sky and study the location of individual constellations. This is already observation. In the field of natural sciences, observation can be carried out using instruments that make it possible to perceive objects and phenomena that are inaccessible to the naked eye (telescope, microscope).

In the sciences, both social and natural, observation is widely used, making it possible to collect facts from which one can draw conclusions about other facts of the same kind. Observation is used constantly in everyday practical activities. We observe various facts, events, objects, notice certain properties, characteristics in them and, based on this, draw general conclusions.

Observation serves as a means of collecting factual material that is processed inductively and serves as a basis for generalizations, for establishing general provisions and general patterns in the development of nature and society.

A special type of observation is self-observation.

Self-observation (introspection) is a direct observation by a person of his own mental states. When we experience various mental emotions: grief, joy, indignation, love, hatred, etc., we can at the same time observe these experiences ourselves, observe ourselves. For example, experiencing joy, I at the same time observe how I experience this feeling, i.e. my own mental experience is the object of observation from my side. Thus, self-observation is a type of observation and differs from ordinary observation in its object. During self-observation, we directly observe the states of our own mental life, whereas during ordinary observation we observe objects and phenomena that lie outside of us. Self-observation as one of the research methods is used in psychology, and the old, idealistic psychology was based on the method of self-observation almost entirely, and Marxist materialistic psychology widely uses methods of experimental, experimental research, which are the basis for the scientific study of mental phenomena.

In the process of scientific and practical activity, observation is constantly supplemented or replaced *by evidence, which consists of obtaining information about a particular phenomenon from another person who observed this phenomenon*. Evidence is used in cases where the person researching certain phenomena is deprived of the opportunity to directly observe these phenomena, as well as in cases where reports from other people make it possible to verify the accuracy of observations. Thus, a historian studying events related to the distant past (for example, the Patriotic War of 1812 or the Crimean War) uses various testimonies of contemporaries in the form of memoirs, letters, etc.

An experiment is an artificial induction or change of some phenomenon with the purpose of observing it under the most favourable conditions. As we already know, facts are observed in the form in which they occurred, as they are given to our perception, and therefore observation can often be incomplete, inaccurate due to unfavourable conditions of observation. By conducting an experiment, we artificially induce a phenomenon at our will, change this phenomenon in comparison with how it usually occurs, repeat it several times and get the opportunity to study it comprehensively, which is not always possible with simple observation. All experiments in chemistry, physics and other natural sciences, for example, the decomposition of matter into elements, testing the force of steam, studying the action of electricity, radio waves, etc., are research through experiment.

§ 3. INDUCTION BY SIMPLE ENUMERATION

In logic, there are two types of induction: induction through simple enumeration and scientific induction. Let us consider both of these types.

The essence of induction through simple enumeration is that from the characteristics of individual homogeneous objects that were observed, by listing these objects, a conclusion is made about all objects of a given kind only on the basis that, when examining a number of objects, no contradictory facts were encountered.

The full name of this type of induction is *induction through simple enumeration, where there are no contradictory facts* (inductio per enumeration simply, ubi non reperitur instant contradictory).

Induction by simple enumeration expands our knowledge, but it does not give reliable conclusions and can lead to erroneous inferences. Indeed, what we observe in a number of objects and phenomena, we generalize, i.e. extend to all objects and phenomena of the same kind, but it is quite possible that our observations were not complete enough. In those phenomena that we observed, there was no contradictory fact, but this could have happened because such phenomena accidentally fell into the sphere of our observation, and if we had continued our observations, perhaps we would have found phenomena of a different nature and our generalization would have turned out to be incorrect.

If in all the phenomena that we have observed there was some specific circumstance, then we expect that in other phenomena of the same kind we will encounter this same circumstance, but there will still be no complete certainty; we may subsequently encounter such a phenomenon of the same kind, where there will be a completely different sign, a different circumstance.

From constantly repeated observations people knew that swans are white, and for centuries this observation served as the basis for the general judgment — "all swans are white"; it was considered true and did not give rise to any doubts. However, after the discovery and exploration of Australia, black swans were found there, i.e., precisely that "contradictory fact" the absence of which is a necessary condition of the inference constructed according to the type of induction through simple enumeration. It is characteristic of induction through simple enumeration that we observe a certain constancy of facts, a certain stability of features in many facts, but we do not know the reason for this, we cannot explain the reasons for this constancy. We observe uniformity of features in different facts, but we do not know the reasons for this uniformity. If we saw that all the observed objects of a given kind have some identical feature, but do not know the reason why they have this feature, then we can expect the same feature in other objects of this kind, but we cannot be completely sure of this. All the swans that were seen were white, so it was believed that whiteness was the natural colour of the plumage of swans; but the reasons why swans should necessarily be white were not known, and therefore it could not be asserted with certainty that white plumage was necessarily inherent in all swans, that swans of a different colour would not be found. This is what actually happened when black swans were discovered in Australia.

Nevertheless, induction by simple enumeration is of great importance as an initial stage of research. If the conclusions obtained by induction by simple enumeration are considered not as final results of the research, but as probable assumptions that require further verification (hypotheses — see below for more details), induction by simple enumeration can be very useful. The degree of probability of conclusions obtained by induction by simple enumeration depends on the number of facts studied, on the breadth of the material on which the conclusion is based. If we observed only a small number of facts, objects, phenomena of a given kind and found a certain feature in all of them, without encountering a contradictory fact, our conclusion about the presence of this feature in all facts, objects, phenomena of this kind will be probable only to a very small degree, since we studied few objects, and it is very likely that this feature will not be found in some other objects of the same kind. But if we have examined a huge number of objects (facts, objects, phenomena, events, etc.) and have found a certain feature in all of them, without ever encountering a contradictory fact, the probability that all objects of a given class actually have this feature increases greatly, rises. But this will still be a probability, albeit a very high one, but not a certainty (i.e., truth), since, as long as we do not know the reason why this feature *is necessarily* inherent in a given class of objects, we cannot be sure that *a law has actually been discovered* (see below about the law). Thus, in a conclusion in the form of induction through simple enumeration, the premises are not a sufficient basis for a general categorical and reliable conclusion.

§ 4. SCIENTIFIC INDUCTION

Scientific induction is the type of induction in which, from the characteristics of observed objects and phenomena, a conclusion is made about the same characteristics of all objects and phenomena of a given kind on the basis that the reasons have been established for which objects and phenomena of a given kind necessarily have these characteristics.

In contrast to induction through simple enumeration, scientific induction is based not only on the observation of the uniformity of the characteristics of certain objects of a given kind, but also on the study of those reasons that determine that objects of a given kind necessarily possess such characteristics.

Let us give an example. It is known that metals expand when heated. If we based this conclusion only on the fact that in all cases when metals were heated, they expanded, this would be induction through simple enumeration, and the question would always remain open as to whether there might be a case when heating a metal does not entail an increase in its volume. But when we found out the reason that causes the expansion of a metal when heated, namely the weakening of the cohesion of molecules under the action of heat, this conclusion became not approximate, but precise. This is scientific induction.

The logical process of inductive inference under consideration can be schematically described as follows:

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\begin{array}{c}
M - r \\
A.\ B.\ C.\ D.\ E.\ .\ .\ .\ .\ .\ .\ .\ K.\ .\ .\ O \\
p\ .\ p\ .\ p\ .\ p\ .\ p\ .\ .\ .\ .\ .\ .\ .\ R.\ .\ .\ R
\end{array}
$$

We are studying objects belonging to the class (genus) *M*. We have managed to study objects *A, B, C, D , E* and many others from the objects belonging to class *M , and we have found the characteristic p in all of them* . We can increase the number of objects of class M studied and we find the same characteristic *p in all of them* . But we cannot study all objects of class *M without exception* . The fact that all studied objects of class M invariably show the characteristic *p* and there has not been a single case where any object of this genus did not have the characteristic *p* serves as the basis for a general conclusion: *all objects of class (genus) M have the characteristic p.*

Our whole reasoning so far has been purely inductive. But it is easy to see that this is induction by simple enumeration, where no contradictory facts have been encountered. We can continue our investigation, especially carefully search for the most hidden, hitherto unknown objects of class *M*, and if they all also have the attribute *p*, our confidence that all objects of the genus *M* have the attribute *p* is strengthened, the probability that all objects of class *M* *actually* have the attribute *p* increases. But still this is still induction by simple enumeration and only a probable, although very probable, but not a certain conclusion, since there always remains the possibility that in the future we will find an object of class *M* that will not have the attribute *p* , but will have some other attribute that excludes *p* . What is needed for our assertion that all objects of class M have the attribute *p* to be completely reliable, scientifically substantiated, i.e., for it to be scientific induction, and not induction by simple enumeration? To do this, we need to know why, for what reason, objects of class M necessarily, and not accidentally, have the attribute p. Let us assume that we have learned this reason, as a result of which our conclusion ceases to be an induction through simple enumeration, but becomes a scientific induction. Then this conclusion takes the form that can be expressed in the following diagram: "The presence of circumstance *R determines the presence of attribute p*. In all objects of class *M* there is necessarily circumstance *R*. Consequently, all objects of class M necessarily have the attribute *p* ."

This is a syllogism, the first figure, the mode *AAA*. It is precisely this combination of inductive reasoning with deductive reasoning (syllogism) that is a necessary property of scientific induction, as opposed to induction through simple enumeration.

This can be demonstrated by the example given above. We constantly observe that heating a metallic body expands its volume. We perform many experiments on various metals and in all cases we observe the expansion of a metallic body under the effect of heating. We formulate the general proposition: “metallic bodies expand when heated.” This is induction through simple enumeration. For Togo to this conclusion has acquired the character of scientific induction, it is necessary to establish the reason by virtue of which heating the metal entails the expansion of its volume. The reason has been established: the expansion of the metal upon heating is the result of the weakening of the adhesion of molecules under the influence of heat. Then we build the following conclusion: “the weakening of the adhesion of molecules is a circumstance that causes an increase in the volume of a metal body; heating a metal body causes a weakening of the adhesion of molecules; therefore, heating a metal body increases its volume, or, what is the same, metal bodies expand from heating.” This is a syllogism, the first figure, modus *AAA* .

Let us give another example. Throughout its existence, capitalist society has been periodically shaken by crises: manufactured goods could not be sold, enterprises closed, banks, industrial and commercial enterprises went bankrupt, workers were laid off *en masse*, the army of unemployed increased enormously, etc. These crises recurred periodically and attracted the attention of bourgeois economists. The very fact that crises systematically and periodically arose could serve as the basis for an inductive conclusion through a simple enumeration: since crises have recurred periodically up to now, they will continue to arise. But Marxism-Leninism has established the true causes of crises in capitalist society, which are the result of the contradictions of the capitalist mode of production itself.

At the 16th Congress of the All-Union Communist Party (Bolsheviks), Comrade Stalin said: "The basis of economic crises of overproduction, their cause, lies in the system of capitalist economy itself. The basis of the crisis lies in the contradiction between the social character of production and the capitalist form of appropriation of the results of production. The expression of this fundamental contradiction of capitalism is the contradiction between the colossal *growth* of capitalism's production potential, calculated to obtain *the maximum* capitalist profit, and the relative *reduction* of effective demand on the part of the millions of working people, whose standard of living the capitalists are constantly trying to keep within the limits of the extreme *minimum*."[1]

This means that crises are an inevitable companion of capitalism, and they will continue to occur as long as the latter exists; the elimination of crises can be achieved only by eliminating capitalism. In arriving at such a completely reliable conclusion, induction undoubtedly played a role—an inference from particular cases of observed crises to a general assertion about the inevitability of crises under capitalism. This induction is scientific, and, as we see, it is combined with deduction: the inevitability of crises is based not only on the fact that crises have been periodically repeated

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[1] *J. V. Stalin*, Questions of Leninism, 10th ed., p. 350.

until now, but also on the fact that this follows from a more general position—from the general properties of the capitalist social system, from the general laws of the capitalist economy. But the most important thing is that the discovery of these laws and the deduction from them of the inevitability of crises under capitalism is achieved by the method of scientific research, going beyond the limits of formal logic, breaking through its horizon — the method of dialectical materialism, for which in this case, as in all others, the deductive and inductive methods of formal logic serve only as an auxiliary means, necessary, but not the main one, in the study of the laws of social life.

Thus, scientific induction is related to deduction.

The constancy of the characteristics of objects of a certain class, discovered purely inductively, leads the researcher to the conclusion that these characteristics are present in all objects of the given class (remember, induction is guidance), and the resulting conclusion acquires the force of a reliable, rather than probable, judgment when it itself can be derived from other reliable positions (remember, deduction is inference).

The logical process of scientific induction takes the following form. A study of numerous homogeneous facts, various objects of the same class is carried out. The research is carried out as fully and comprehensively as possible, so that the selection of collected and studied facts is not random and arbitrary. Inductive research must therefore have a methodical character. A necessary property of scientific induction is the methodical character of the study of those objects, facts, phenomena that serve as the basis for the conclusion about unknown objects, facts, phenomena of the same class. The absence of contradictory facts, i.e.

facts that contradict the discovered uniformity of features in the studied objects of a given class, can be both the result of a truly existing objective pattern, and the result of a superficial, incomplete study. It may be that in the studied objects of a given class we saw the presence of a certain feature and did not encounter cases of its absence simply because we accidentally came across exactly such objects, and we stopped at them. But if we were to continue the research, if the research were conducted in different directions, if we were to look for objects of a given class in different places and under different conditions, it is quite possible that we would completely abandon the assertion of an existing pattern, because it does not exist at all. This means that not a random, arbitrary selection of individual objects, facts and phenomena that are most striking to the eye, but a careful, systematic and methodical study of the most diverse objects of a certain class, located in different conditions, is a necessary property of scientific induction.

But the methodical nature of inductive research does not yet ensure the complete reliability of the conclusions obtained inductively. With the methodical nature of the research, the probability of a random selection of facts, objects, and phenomena being studied is eliminated, but the discovered uniformity and constancy of the studied objects of a certain class does not yet have *the necessary* character. Although the connection of facts, objects, and phenomena is found to be stable and constant, it is not yet *necessary* , i.e. such that the belonging of objects to a certain class necessarily determines the presence of certain characteristics in all these objects. Then deduction, mediated deductive inference, i.e. *syllogism, is included in the study process*. The factual material collected inductively is subjected to deductive analysis, from this material that which is not necessary, necessarily inherent in a given class of objects, is discarded, and the statement about the characteristics of objects of a given class is deduced as a consequence, necessarily following from the premises connected according to the rules of the syllogism. We have already seen this in the examples given above. If the conclusion about the characteristics of objects of a given class really does necessarily follow from the propositions whose truth is indubitable and which serve as the premises of the deductive mediated inference, the proposition thus established is reliable. The initially discovered, stable and constant connection of the phenomena of reality becomes *a law*. In inference in the form of scientific induction, in contrast to induction through simple enumeration, the premises are a sufficient basis for the conclusion, which necessarily follows from this basis.

§ 5. CAUSAL CONNECTION OF PHENOMENA

As can be seen from the above, scientific induction in its general conclusions relies on the establishment of the causes by virtue of which certain characteristics are inherent in objects of a given class. Therefore, the question of the causal connection of phenomena is of extreme importance for scientific induction. *The causal connection of phenomena consists in the fact that one phenomenon necessarily causes another phenomenon,* *and a change in the first phenomenon entails a change in the second phenomenon.* A phenomenon that necessarily causes another is called *a cause*, and the second phenomenon, which is caused by this cause, is called *the action* of this cause.

The causal connection is otherwise called a causal connection (from the Latin word causa — cause).

Thus, the connection between cause and effect is the connection between two phenomena, two facts. The connection between cause and effect in phenomena corresponds in thinking to the connection between reason and effect, which we have already discussed earlier (Chapter II , § 5). But in the science of logic and in other sciences this terminology is not always maintained, and a phenomenon representing the action of a cause is sometimes called a consequence, and not an effect. The result of a cause, i.e. a phenomenon necessarily caused by another phenomenon, can be called in the same sense either by the term “action” or by the term “effect”. *In the following exposition we will also use both of these terms.

Let’s give some examples. We heated an object, it expanded, increased in volume; heating of an object is the cause; expansion, increase in volume is the action (consequence). The rotation of the Earth around its axis is the cause of the change of day and night, and the change of day and night is the action (consequence) of the rotation of the Earth around its axis.

The emergence of private property in the instruments and means of production and the division of society into antagonistic classes of exploiters and exploited is the cause of the emergence of the state, and the emergence of the state is the action (consequence) of the emergence of private property and the division of society into antagonistic classes.

The introduction of machines into the collective farms of our village increases labour productivity in agriculture; the introduction of machines is the cause, the increase in labour productivity is the effect (consequence).

And so in all areas of reality we constantly observe how one phenomenon causes another phenomenon. *There is no action (effect) without a cause, and there is no cause that would not have an action (effect).*

If we encounter a phenomenon that serves as a cause, but do not discover the action (effect) produced by this cause, then this means either that we have not yet found this action, have not been able to recognize it, although in reality it exists, or that the action of this cause is paralyzed, destroyed by the reverse action of another cause.

If we encounter a phenomenon that seems to have no cause, it only means that we have not yet managed to find its cause, although such a cause exists.

All phenomena of reality are connected by a causal connection. A causal connection is a universal (common) connection of phenomena of reality. However, a causal connection does not exhaust the entire connection of phenomena of reality; it represents only one side of this connection. Lenin wrote about the causal (causal) connection: “Cause and effect, ergo , are only moments of universal interdependence, connection (universal), interlinking of events, only links in the chain of development of matter... The comprehensiveness and all-embracing character of the world connection, only one-sidedly, fragmentarily and incompletely expressed by causality... Causality, as we usually understand it, is only a small part of the world connection, but (a materialistic addition) a part not of a subjective but of an objectively real connection"[1].

The connection between cause and effect is in fact very complex, much more complex than it seems at first glance. Cause and effect are not separated, not fenced off from each other, there is an interdependence, a relationship between them; what is a cause in one respect can be a consequence in another respect and vice versa. An example can be given to illustrate this idea. The construction of a socialist society in the USSR was the reason for the rapid growth of the culture of the Soviet people, and the development of Soviet culture in turn serves as one of the reasons for the success of further socialist construction.

The causal connection of phenomena is an objective connection, i.e. a connection that exists in reality, independently of our consciousness, which only reveals and reflects this connection. Observing the phenomena of reality, we notice a certain regularity of their alternation, and this makes us think about a causal connection, but in order to discover a real causal connection, to be convinced of the real existence of a causal connection of different phenomena, this alone is not enough. Let us cite Engels' remarkable thoughts on causal connection.

" *Causality*. The first thing that strikes us when considering matter in motion is the mutual connection of the individual movements of individual bodies with one another, their causality with one another. But we find not only that a certain movement is followed by another movement, we also find that we are able to

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[1] *V. I. Lenin*, Philosophical Notebooks, pp. 134, 135, 136.

cause a certain movement by creating the conditions under which it occurs in nature; we even find that we are able to cause movements that do not occur in nature at all (industry) — at least, do not occur in this form — and that we can give these movements a direction and dimensions determined in advance. *Thanks to this,* thanks to *human activity, the idea of causality* is substantiated, the idea that one movement is *the cause of* another. True, the regular alternation of certain natural phenomena alone can give rise to the idea of causality — heat and light appearing together with the sun — but here there is still no proof, and to that extent Hume's scepticism would be right in its assertion that the regularly repeating post hoc [after something] can never justify propter hoc [due to something]. But human activity carries out a test of causality. If, with the help of a concave mirror, we concentrate the sun's rays in a focus and cause the same effect with them as a similar concentration of the rays of ordinary fire produces, then we prove that heat comes from the sun. If we put a primer, a charge and a bullet into a gun and then fire it, then we count on an effect known in advance from experience, since we are able to follow in all details the entire process of ignition, combustion, explosion caused by a sudden transformation into gas, the pressure of the gas on the bullet"[1] .

This means that practice, the ability to evoke and repeat phenomena, and verification through experience serve as a means of discovering the actual causal connection between phenomena.

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[1] *F. Engels*, Dialectics of Nature, pp. 184-185.

To reveal, to establish the causal connection of phenomena, to find where the cause is, where the effect (action) of this cause is, is not easy, because each phenomenon of reality is caused not by one phenomenon, but by a series of phenomena. Any phenomenon can have several causes, and not just one cause; equally, one phenomenon can serve as the cause of many other phenomena. Each phenomenon that serves as the cause of another phenomenon, in turn, has a cause, i.e. is the effect of another phenomenon. Therefore, the "cause of the cause" of a phenomenon is also the cause of this phenomenon, but a more distant one.

The immediate cause of a phenomenon is called *the proximate cause* (causa proxima).

The cause of a phenomenon always precedes this phenomenon. Therefore, when we have some phenomenon and look for its cause, we must look for the cause among those phenomena that preceded this phenomenon. A subsequent phenomenon cannot be the cause of a given phenomenon. Thus, *the cause always precedes the effect*. But it is necessary to keep in mind the following: *every cause of any phenomenon precedes it, but not every phenomenon that precedes a given phenomenon serves as its cause*. There may be a situation where one phenomenon precedes another, but it is not its cause. The chronological (temporal) sequence of phenomena is not yet their causal connection.

Violation of this provision is expressed in a logical error, denoted by the Latin expression post hoc, ergo propter hoc (what happened after a given fact is a consequence of this fact). After a given fact there could have been other facts, but they are not in a causal relationship with this fact.

Let’s take an example. Before the war of 1812, a large, brilliant comet appeared. Superstitious people thought that the appearance of this comet was a sign that the war was about to begin. Indeed, Napoleon soon invaded Russia. In fact, there was no causal connection between these events, but a simple chronological sequence. Error post hoc, ergo propter hoc occurs in all those cases when some previous phenomenon is presented as the cause of a phenomenon solely on the basis that it immediately preceded the given phenomenon, occurred before it.

The great Russian materialist philosopher **N. G.** Chernyshevsky wrote about this in his article “Superstition and the Rules of Logic”: “When we want to investigate whether some circumstance can be considered the cause of a known fact, logic prescribes that we... more carefully examine nature and history in order to see whether this fact is repeated in its full force even where there is no circumstance that is superstitiously connected with it”[1].

To establish a causal relationship between phenomena means to determine which phenomenon is the cause of another phenomenon. There can be two different positions here.

1. A cause may be established that relates to a class of objects, facts, phenomena, i.e. a cause that determines the characteristics of a class of phenomena, the properties and relationships of phenomena of one class, or the relationships between phenomena of

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[1] *N. G. Chernyshevsky*, Selected Economic Works, Vol. II, 1948, pp. 268-269.

different classes. In this case, the discovery of a cause means the discovery of a certain regularity of the phenomena of reality, the establishment of a law of nature or social development, i.e. a general and necessary connection of the phenomena of objective reality. For example, a change in productive forces and production relations is the cause of a change in the social system at different stages of the development of human society. The rotation of the Earth around its axis and around the Sun is the cause of the alternation of day and night and the change of seasons. In these cases, to establish a cause means to establish a law.

2. A cause may be established that relates to one specific, individual object, fact, phenomenon, i.e. a cause that caused a specific phenomenon, changed a separate, specific object. For example, the cause of a certain action of a given person or the cause of a drop in the water level in a given reservoir, etc. is established. In these cases, establishing the cause means establishing not a general law, but a separate, individual fact, phenomenon (or several phenomena), in certain specific conditions of place and time that caused, gave rise to another separate, individual object, fact, phenomenon.

The establishment of the cause in the first sense quite obviously refers to induction in its typical form, since in these cases the establishment of the cause represents a general position, established on the basis of many particular cases and extended to all objects of a given kind, of which only some were considered in the premises.

The establishment of a cause in the second sense is the conclusion of an individual fact on the basis of another individual fact; here the conclusion is made from one individual fact to another individual fact. Is this also induction? An inference establishing a causal connection between individual facts, determining which fact is the cause of another fact, is also an inductive inference, since in it the conclusion goes beyond the premises and refers to something that is not contained in the premises. Indeed, if we investigate the cause of some phenomenon, then we look for an unknown cause based on the effect known to us (the circumstances of the given phenomenon, its characteristic features). The judgments that make up the premises establish certain individual facts, the circumstances of the given case; the judgment that makes up the conclusion establishes that such and such a fact is the cause of the given event, whereas nothing was said about the cause in the premises, therefore, the conclusion contains a new concept that was not in the premises. And this is a necessary property of inductive inference. only the most typical form of which is inference from the general to the particular. But here too, as we shall see further, inductive inference must be combined with deductive inference in order for its conclusion to be reliable. With all the differences in the inferences in which these forms of causal connection are established (from the particular to the general in the first case and from the particular to the particular in the second), both relate to induction, and the establishment of a causal connection in all cases! has one basis — inference from known facts considered in the premises, to unknown facts not considered in the premises.

§ 6. LOGICAL TECHNIQUES FOR ESTABLISHING THE CAUSES OF THE PHENOMENA UNDER STUDY

To establish the cause of the phenomenon being studied, two main methods of inductive research are used: 1) comparison of the circumstances under which a given phenomenon occurs, 2) comparison of the circumstances under which a given phenomenon occurs with circumstances that are similar in other respects, under which a given phenomenon does not occur.

The first method is as follows. To establish the cause of a phenomenon, various circumstances are taken under which a given phenomenon has occurred two or more times, and they are all compared with each other in order to discover how the circumstances under which a given phenomenon has occurred several times are similar and how they differ. If it turns out that all cases of the occurrence of a phenomenon are similar only in one circumstance, and are different in all other circumstances, then we can conclude that this circumstance is the cause of the phenomenon.

By using this method, for example, the cause of the rainbow was discovered. Rainbows were observed in the sky during rain, in dew drops, in the spray of a waterfall, in the splashes of water on a river from the blows of oars. All the circumstances in which a rainbow was observed were different, except for one thing common to all cases of rainbow appearance—light passed through drops of water. From this, the conclusion was made: the cause of the rainbow is the passage of light through drops of water.

Another method of establishing the cause of the phenomenon under study is as follows. In determining the cause of any phenomenon, we consider all the circumstances under which this phenomenon occurred, and then similar circumstances under which this phenomenon did not occur. If it turns out that the circumstances under which the phenomenon occurred and the circumstances under which it did not occur are similar, except for one circumstance, which was present when the phenomenon occurred and which was not present when the phenomenon did not occur, we can conclude that this circumstance is the cause of the phenomenon under study. Let us give an example. Let us take a bird feather and a coin of the same weight and throw them to the ground from the same height at the same time. The coin will fall faster, but the fall of the feather will be slow. What is the reason for the slow fall of the feather? Let us place the feather and the coin under the bell of an air pump and pump the air out of it. Then let us throw the feather and the coin under the bell; they will fall with the same speed. In the first case, the fall of the feather was slower than that of the coin, in the second, it was simultaneous. The difference in circumstances here was only one: in the first case there was air, in the second case it was pumped out. Conclusion: the reason for the slow fall of the feather is air resistance. Another example. In all cases of removal of the occipital lobe of the brain, visual perception disappeared in animals. From this followed the conclusion that the centre of visual perception is located in the occipital lobe of the brain.

When using both of the above methods, it may turn out that the cause of not the entire phenomenon under study will be established, but only a part of it. If it turns out that one part of the preceding phenomenon was the cause of one part of the subsequent phenomenon, we can conclude that the rest of the preceding phenomenon was the cause of the rest of the subsequent phenomenon. Suppose that phenomenon ABC precedes phenomenon *abc*. If we know that *A* is the cause of *a, B* is the cause of *b* , we can conclude that *C* is the cause of *c* . As an example, let us cite the history of the discovery of the planet Neptune. Observing the motion of the planet Uranus, astronomers noted some irregularities in its motion: they discovered that it was not moving along a completely normal orbit. The task was to find out the causes of these deviations **of** Uranus. These deviations could be caused by the influence of other planets. Other planets were known, and it was possible to calculate the degree of influence they could have on the motion of Uranus. However, this only explained most of Uranus's deviations, but not all. Scientists assumed that there was another unknown planet that affected the movement of the planet Uranus. And indeed, while studying those deviations in the movement of the planet Uranus, the cause of which was not yet known, astronomers Adams and Leverrier calculated the position of this unknown planet. When this point was established, the most powerful telescope was directed at it and a previously unknown planet was indeed discovered. Thus, in 1846, the planet Neptune was discovered.

As a variant of the two main methods of establishing the cause of the phenomenon under study, the following method can be used. Wanting to find the cause of a given phenomenon, we observe its changes and simultaneously monitor the changes in other phenomena that may be causally related to it.

If one phenomenon changes in a certain way whenever another phenomenon also changes in a certain way, one of these phenomena is the cause and the second phenomenon is the effect (action), or both of them are the effect (action) of a third phenomenon, which serves as the cause for both of them.

Thus, for example, a dependence of the change in the height of water in the ocean on the position of the Loupe, or a dependence of the change in the volume of a body on the change in its heat was discovered.

All the logical methods of establishing the causal relationship of phenomena discussed above are of great importance in scientific research and in practical activities.

But for the success of the research, in order to find the cause of the phenomenon with certainty, these methods alone are usually not enough. They can help to discover the real cause, but they cannot establish this cause with complete certainty, they cannot fully prove it. Every conclusion we make with the help of these methods, every discovered pattern must be verified by experience, practice. These methods are of great importance for finding the causes of various phenomena we study, but to be sure that we have really found the cause, that there is no other cause, these methods alone *are not enough*. It is necessary to study each given case in connection, in combination with all the circumstances that we can and must study, and a comprehensive verification in practice of the results achieved.

In essence, the methods under consideration are based on the technique of isolating phenomena and establishing the connection that is discovered between these *isolated* phenomena.

This method of isolating the phenomena being studied is needed as a preparatory, auxiliary method for studying the causal relationship of phenomena, but it does not exhaust truly scientific research.

Comrade Stalin wrote: "...the dialectical method believes that no phenomenon in nature can be understood if taken in isolation, without connection with surrounding phenomena, for any phenomenon in any area of nature can be turned into nonsense if it is considered without connection with surrounding conditions, in isolation from them, and, conversely, any phenomenon can be understood and substantiated if it is considered in its inseparable connection with surrounding phenomena, without being conditioned by the phenomena surrounding it"[1]. Therefore, the method of isolating phenomena is applicable either to the study of the simplest relationships between things, or as an auxiliary method in applying the method of materialistic dialectics to the study of natural and social phenomena.

The dialectical method of research does not deny the logical methods of establishing causal relationships that we have examined, but they are auxiliary to it. When studying patterns in nature and society, we have to use these methods, but their application gives a fruitful result on the basis of the main method of research — the method of materialistic dialectics. If we limited scientific research of natural and social phenomena only to these methods, we would never have discovered or proven real patterns.

The methods of establishing the cause of the phenomenon under study are most widely used in the natural sciences, where it is possible to isolate

[1] *J. V. Stalin*, Questions of Leninism, 11th ed., p. 536.

individual phenomena in the fields of their study by means of an experiment. In the social sciences, the situation is much more complicated, since social phenomena always appear before us in combination with many other social phenomena, from which they cannot be isolated by means of an experiment. In addition, each social phenomenon is complex, includes various circumstances, and consists of many facts and events. Nevertheless, when studying social phenomena, we notice repetition in them, observe stability, similarity of features in some phenomena, and differences in features in others. As a result, the methods considered are to a certain extent applicable to the study of social phenomena. But the decisive condition for being convinced of the presence of a real causal connection between natural phenomena and social life is in all cases experience and practice, since they are the criterion of the truth of our expectations of causality.

§ 7. MULTIPLE CAUSES AND MIXTURE OF EFFECTS

Now let us consider two provisions that complicate the establishment of a causal relationship between phenomena not only in the study of social phenomena, but also in the study of natural phenomena. These provisions are called *the plurality of causes and the mixing of actions*. As we could see from our acquaintance with the methods of establishing the cause of the phenomenon under study, these methods proceed from the assumption that each individual phenomenon has its own special, separate cause. A separate phenomenon is the cause of another, also separate phenomenon, or, in other words, one separate preceding phenomenon causes another separate subsequent phenomenon. In many cases, such an assumption is justified. But there are often cases of a much more complex combination of phenomena and a more complex connection between them. In logic, these cases are called the plurality of causes and the mixing of actions.

A plurality of causes is a feature of the manifestation of causal connections, according to which a given phenomenon could be the result of one of several causes. This should be understood in the following way. The phenomenon we are investigating could have been caused not by one single cause, but by several different causes. When we investigate a given phenomenon, we see that it could have been the result of one, or another, or a third, or a fourth cause, so that among all the phenomena that could have produced this phenomenon, we will have to find only one that actually produced the phenomenon we are investigating. We have phenomenon *B*, and we know that *B* could have been produced by either *A*, or A_1, or A_2. This means that phenomenon B has *one* cause, but we do not know which one, since phenomenon B could have been produced by either A, or A_1, or A_2. We can give the following example: the sun is the cause of heat; friction is the cause of heat; impact is the cause of heat; electricity is the cause of heat. This means that the cause of heat can be the sun, electricity, friction, or impact on an object. Consequently, in each individual case of heating of an object, we need to find a specific cause from among those that can generally produce this phenomenon.

Mixture of effects consists in the fact that a given phenomenon is the result of the joint action of several causes, and not of any one cause.

This means that phenomenon *B* is a consequence not of *A separately* , and not of A_1 separately and not of A_2 separately , but the result of their combined action. The cause of B is $A + A_1 + A_2$. For example, a successful resolution of a complex scientific problem by a scientist could be a consequence (action) of not one, but several reasons: persistence and method logicalness of scientific research, the talent of the researcher, favourable working conditions, assistance in the work and its critical discussion by the scientific team. When studying social phenomena, a situation always occurs when a given phenomenon is created as a result of the combined action of several reasons. Let us give such an example.

In his speech at the first All-Union Conference of Stakhanovites, Comrade Stalin, examining the roots of the Stakhanovite movement, pointed out four main reasons for the emergence and rapid spread of the Stakhanovite movement in our country: 1) a radical improvement in the material situation of workers in the USSR, 2) the absence of exploitation, as a result of which people work not for exploiters, but for themselves, for their class, for their own, Soviet society, 3) the presence of new technology in our country, 4) the presence of new people—workers, men and women, who have mastered the new technology [1] .

Thus, between the plurality of causes and the confusion of effects there is the following difference. *In the plurality of causes, one cause is at work, but it must be found among several possible causes. In In a mixture of actions, several causes act simultaneously, and this phenomenon is the result of their combined action .*

If we have a plurality of causes, i.e. a given phenomenon could be the result of one of several causes, then we need to find out which cause exactly the phenomenon was the result of. Of the various causes that could produce the same effect, each acts in a special way, different from the action of the other causes. One phenomenon *B* can be the effect of different causes: either *A* , or A_1 , or A_2. Although A, A_1 , and A_2 each separately can produce the same phenomenon *B*, each of them acts in a special way, different from the action of the others.

For example, flowers planted in the garden dried up. This could have happened either because of unsuitable soil or because of lack of moisture, both causes produce the same effect in this case. But if the flowers dried up because of lack of moisture, the soil will be dry, which may not be the case if the flowers dried up for another reason. These signs can be used to determine which cause was at work in this particular case. Consequently, with multiple causes, we recognize the cause that was at work in this case by the specific way it acts.

If we have a mixture of actions , i.e. a joint action of several causes, then the task is to clarify all these

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[1] See J. *V. Stalin*, Questions of Leninism, 11th ed., pp. 499–501.

causes, their connection with each other, the significance of each of them. The connection of these causes can be expressed both in the fact that some causes enhance the effect of others, and in the fact that some causes weaken or completely destroy the effect of others. Such a mixture of actions is often encountered in life, in practice, in our daily activities. An example was given above — a successful solution to a scientific problem as a result of the joint action of several causes, each of which enhanced the effect of the others (the talent of the researcher, favourable working conditions, etc.). Another example. The speed of movement of a ball on a plane, imparted by a push, can decrease due to the roughness of the surface on which the ball moves. Here one cause weakens the effect of another. The confusion of actions explains the sometimes incomprehensible at first glance situation when an obviously acting cause does not produce any visible effect. In reality, such a situation only means that in addition to the given acting cause, some other, hidden cause acts in the opposite direction, the action of which paralyzes the action of the first cause, for example, a fire did not ignite a combustible material because the latter was wet in water.

§ 8. HYPOTHESIS

Inductive research is unthinkable without a special logical thinking technique called a hypothesis. A hypothesis is a hypothetical explanation of a phenomenon, i.e. an assumption about its real cause. The process of finding out the cause of a phenomenon can be more or less complicated. Sometimes it can be extremely complicated and difficult, sometimes relatively simple and easy.

But in all cases when the cause of a phenomenon or many phenomena, one fact or a whole class of facts is not given to us with obviousness by the very situation in which these phenomena and facts occurred, it is necessary to construct a hypothesis explaining these facts and to test this hypothesis.

We investigate some phenomenon or class of homogeneous phenomena, discover some constant features in these phenomena and want to know their cause, establish a law that explains these phenomena. This research process consists of the following stages:

1. *Study of the circumstances of the phenomena under consideration.* We want to know the cause of some phenomena. First of all, we must become thoroughly familiar with these phenomena, find out and record their circumstances.

2. *Formulating a hypothesis, i.e. making an assumption about what cause could have caused these phenomena.* In the first stage, we became familiar with the phenomena themselves and studied them in detail. Now we must make an assumption about the possible cause of these phenomena, so that this assumption can be verified by further research.

3. *Deriving from this supposed cause its consequences, i.e. determining what consequences would have resulted if this particular cause had acted.* After a hypothesis has been formulated, i.e. an assumption has been made about the cause of a given phenomenon or class of phenomena, it is necessary to establish the following: if the supposed cause really existed, then it should have entailed such and such a

consequence. This consequence, necessarily following from the cause that is supposed, must be determined.

4. *Checking the circumstances of the phenomena being studied to see whether this effect exists or not.* After we have constructed a hypothesis and deduced from the supposed cause the effect that should have occurred if such a cause were in effect, we must check the circumstances of the given phenomena to see whether this effect actually exists or not.

5. *The conclusion about what is the cause of the phenomena being studied is the conclusion from the entire course of the study.*

A simple example can be given that will explain all five of these stages. A person falls ill, a doctor is called in who must make a diagnosis, i.e. find out the cause of the person's painful condition. The doctor begins by questioning the patient, listening, tapping, etc. This is the first stage—studying the phenomenon itself, the symptoms of the disease. After that, the doctor builds a hypothesis: apparently, the person is sick with such and such a disease. This is the second stage—building a hypothesis. The third stage—reasoning: if a person is sick with this disease, then it must necessarily be accompanied by such and such phenomena. The fourth stage—the doctor carefully checks for the presence of all the phenomena indicating illness with this disease through further observations and research. If these phenomena are present, the doctor concludes (the fifth stage) that the patient is sick with this disease. If it turns out that these phenomena are not present, the doctor gives a negative conclusion: this is not the disease that was assumed, after which a new hypothesis and new research follow. Of course, such a logical research process takes place only in complex cases when the doctor cannot immediately make an unmistakable diagnosis.

The role of hypotheses is very important in everyday life and practical and scientific activities.

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There are three types of hypotheses: *scientific hypothesis, partial hypothesis and working hypothesis*.

A scientific hypothesis is an assumption about a law (of nature, society, thinking) made on the basis of scientifically collected data.

Engels characterizes the role of hypotheses in the natural sciences as follows: “The form of development of natural science, insofar as it thinks, is a hypothesis. Observation reveals some new fact that makes the previous method of explaining facts belonging to the same group impossible. **From** this moment on, the need arises for new methods of explanation, based at first only on a limited number of facts and observations. Further experimental material leads to the purification of these hypotheses, eliminates some of them, corrects others, until, finally, the law is established in its pure form. If we wanted to wait until the material was ready *in its pure form* for the law, this would mean suspending thinking research until then , and for this reason alone we would never obtain the law”[1] .

When studying natural or social phenomena, we observe in them the constancy of connections, the sequence of stability of a number of their features. This indicates that there is some regularity in these phenomena, some law operates. But the law does not

[1] *F. Engels*, Dialectics of Nature, p. 193.

lie on the surface of the phenomena, it cannot be discovered immediately. The researcher builds a hypothesis, i.e. an assumption about the existence of such a law, gives an approximate formulation of this law, then deduces all the consequences that follow from it in such a way as if this law had already been discovered and substantiated in reality. A comprehensive check of these consequences shows whether this law really exists, whether the hypothesis is confirmed or not. A hypothesis that is substantiated, verified, confirmed by experience, facts, and correctly explains the facts and phenomena of reality, becomes *a scientific theory* .

Such is, for example, the atomic hypothesis, i.e. the hypothesis regarding the atomic structure of matter. For centuries it was only a hypothesis, but in the second half of the 19th century this hypothesis was confirmed by numerous discoveries and studies, and the hypothesis turned into a scientific theory.

The same is Darwin's theory of the origin and development of animal and plant species. Even before Darwin, there were supporters of the evolutionary view of the origin of the animal and plant world, according to which animal and plant species did not appear immediately in a finished form, but developed, changed, and some species originated from others. But this was only a hypothesis, insufficiently substantiated and unproven. Darwin scientifically developed the theory of the evolution of the animal and plant world, tested it on a huge amount of factual material, as a result of which the evolutionary view ceased to be a hypothesis and became a scientific theory.

As Engels points out, Darwin was the first to present coherent evidence that "all the organisms that now surround us, not excluding man, arose as a result of a long process of development from a few originally unicellular embryos, and these embryos, in turn, were formed from chemically produced protoplasm, or protein" [1].

As an example of the transformation of a hypothesis into a scientific theory, one can also point to the discovery by the great Russian scientist D. I. Mendeleyev (1834-1907) of the periodic law of chemical elements, according to which the properties of elements are in a periodic dependence on the value of their atomic weights. This discovery received comprehensive objective confirmation. Engels called Mendeleyev's discovery a scientific feat.

Any hypothesis, no matter how serious and convincing it may be, still remains an assumption until it is tested and confirmed. When a hypothesis is tested and fully confirmed, it ceases to be a hypothesis and becomes a scientific theory. Therefore, any hypothesis (as long as it remains a hypothesis) is not reliable, proven, or indubitable; it is only more or less probable. But, being only probable and not reliable, a hypothesis is at the same time *scientific* if it follows from the studied facts of the phenomena of objective reality and is based on them.

Another type of hypothesis is *a private hypothesis*. A private hypothesis is a hypothetical explanation of a separate, particular fact, case, phenomenon, i.e. an assumption about its actual cause. Thus, a private hypothesis differs from a scientific hypothesis in that it gives an explanation not of a class of objects,

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[1] *K. Marx* and *F. Engels*, Selected Works in Two Volumes, Vol. II, 1948, pp. 369-370.

phenomena, but of a separate fact, phenomenon, and, consequently, formulates not a hypothetical general law, but a hypothetical cause of a single fact, phenomenon. In its content, a private hypothesis can be entirely scientific to no less a degree than a scientific hypothesis in the proper sense, i.e. a hypothesis explaining a class of phenomena (for example, in the historical sciences, when a hypothetical explanation of some historical event is given), but in logic it is customary to call only hypotheses concerning general laws scientific hypotheses.

The concept *of a version is closely related to the concept of a private hypothesis. Version* (Latin versio—turn of phrase)—*This one of the possible explanations of some particular fact*, phenomenon, event. In essence, this is the same as a private hypothesis. The difference between a version and a private hypothesis is only that in the process of studying some phenomenon, several versions can be put forward simultaneously in order to test each one, whereas only one private hypothesis is put forward and it remains until it is either confirmed, rejected, or replaced by a new private hypothesis.

A special type of hypothesis is the so-called working hypothesis. Working hypotheses are very close to versions and differ from versions in that they concern not a single fact or phenomenon, but a group, a class of facts and phenomena. The essence of a working hypothesis is that the researcher, making this or that assumption regarding some fact or phenomenon, does not insist on its truth at all, but uses it as a known assumption, as a position accepted as true only conditionally, because it helps to conduct further research, which will confirm or refute it. Thus, the meaning of working hypotheses is that they facilitate the study of phenomena, but in themselves they do not at all claim to be true, to be reliable.

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A hypothesis is a method of *inductive* research, since the construction of a hypothesis is associated with the study of facts, phenomena and the establishment of their causes. But the use of hypotheses inevitably includes an element *of deduction*, in hypotheses induction is combined with deduction. When a hypothesis is constructed, then, as we already know, its verification consists in the fact that from the supposed cause of the phenomena, the consequence that follows from it is deduced in order to check whether it actually exists in the phenomena and facts being studied, depending on which the hypothesis is confirmed or refuted. Deriving a consequence from a supposed cause is a deductive process, a deductive inference. Likewise, the conclusion itself, the conclusion about the correctness or incorrectness of the assumption made, is clothed in the form of a syllogism.

As indicated above, after a supposition has been made about the cause of a phenomenon or class of phenomena (i.e., a hypothesis has been constructed), the consequence that necessarily follows from it is deduced from this supposed cause, i.e., the facts that would have been present if the supposed cause had acted are indicated. This is a hypothetical judgment, which is the major premise of the syllogism: if *A* is *B* (i.e., if *A* is the cause of *B*), then *C* is *D* (i.e., some phenomenon must necessarily have occurred). If, upon checking the presence of this consequence in the circumstances of the case under study, it turns out that this consequence is not there, i.e., that *C* is not *D*, we obtain a minor premise in which the falsity of the consequence is established. From this, according to the rules of a hypothetical syllogism, it necessarily follows that *A* is not *B* , i.e., that the hypothesis is false and must be rejected as not confirmed. The entire syllogism as a whole looks like this:

If *A* is *B* (i.e. if the hypothesis is true), then *C* is *D* (i.e. such and such a result should have occurred).

C is not *D* (i.e. this result did not occur).

Therefore, *A* is not *B* (i.e. the hypothesis is not true, it is false).

This is the negative mode of the hypothetical syllogism (Modus tollens).

The negative conclusion obtained in this way, i.e. the conclusion about the non-confirmation, about the falsity of the hypothesis due to the contradiction with the reality of the consequence following from it, is completely reliable and categorical.

Here it is very important that the falsity of the consequence, logically following from the supposed basis, is established empirically by testing in practice, due to the discrepancy, the contradiction of this consequence with objective reality. But the reasoning itself, the logical conclusion takes the form of a hypothetical syllogism.

An excellent example of such a refutation of a false hypothesis is the refutation given in 1938 by Comrade Stalin in his brilliant work “On Dialectical and Historical Materialism” of the assumptions that the determining force in the development of society is the geographical environment or population growth:

“If population growth were the determining force of social development, a higher population density would necessarily have to give rise to a correspondingly higher type of social system. In fact, however, this is not the case. The population density in China is four times higher than in the USA, but the USA is higher in terms of social development than China, because in China a semi-feudal system still prevails, while the USA has long since reached the highest stage of capitalist development. The population density in Belgium is 19 times higher than in the USA and 26 times higher than in the USSR, but the USA is higher than Belgium in terms of social development, while Belgium is an entire historical epoch behind the USSR, because in Belgium a capitalist system prevails, while the USSR has already put an end to capitalism and established a socialist system.

But it follows from this that population growth is not and cannot be the main force in the development of society, determining the character of the social system, the physiognomy of society"[1].

Here the logical course of reasoning is expressed with complete clarity. If we assume, i.e. accept the hypothesis, that population growth is the determining force of social development, then the following consequence follows: where the population is denser, the social system is higher. But this consequence turns out to be false, since it contradicts the facts of objective reality: in a number of countries with a higher population density, the level of social development is significantly lower than in a number of countries with a lower population density[2].

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[1] *J. V. Stalin*, Questions of Leninism, 11th ed., pp. 549-550.

But if the consequence is false, the basis is also false, i.e., the supposed cause of social development—population growth. The conclusion is completely irrefutable; nothing can be said against it if we stand on the basis of objective facts.

This is the logical form of inference, in which the hypothesis is rejected due to the contradiction with the reality of the consequence that follows from it.

The situation is more complicated logically in those cases where the consequence following from the supposed cause is present in the circumstances under study. The conclusion here is as follows:

If *A* is *B* (i.e. if the hypothesis is true), then *C* is *D* (i.e. there is such and such a consequence).

C is *B* (i.e. this consequence is actually present).

As we know, in this case it is impossible to conclude that *A* is *B* (i.e. that the hypothesis is true), since according to the rules of the hypothetical syllogism, the truth of the consequence does not follow from the truth of the basis, which can be either true or false.

Therefore, in the case of confirmation of the hypothesis, i.e. the presence in reality of a consequence following from the supposed cause, the conclusion is clothed in a different logical form, namely, in the form of *a disjunctive* syllogism.

If the hypothesis is confirmed and the consequence following from it is obvious, then, in order to be convinced of the truth of the hypothesis, it is necessary

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[2] Comrade Stalin's words refer to China in 1938. Now a significant part of China has been liberated by the People's Liberation Army under the leadership of the Communist Party from the reactionary power of the Kuomintang and from the yoke of the imperialists.

to formulate all possible reasons from which this consequence could follow. The result is a disjunctive judgment, which serves as the major premise of the disjunctive syllogism: *A* is either *B* or B_1 , or B_2 , or B_3. Then all possible solutions are tested sequentially, and if each of them is not confirmed, they are discarded one by one, until all are excluded except one, which turns out to be true.

This disjunctive syllogism will look like this:

A is either *B* , or B_1 , or B_2, or B_3 (i.e. the cause of a given phenomenon consists of this, or another, or a third, or a fourth phenomenon).

A is neither B_1 nor B_2 nor B_3 (the second, third and fourth explanations are not valid, they are incorrect).

Therefore, *A* is *B* (this is the cause).

This is a disjunctive syllogism obtained by the method of affirmation through negation (Modus tollendo nonens).

The conclusion obtained will be quite precise, categorical and reliable only if the major premise: *All* possible solutions are provided, not a single possible cause of the phenomenon under study is missed. If this condition is met, if there are no other causes of the phenomenon under study and there cannot be, then when establishing the falsity of all possible explanations except one, this last one will undoubtedly be true.

But this is a very difficult condition, since there is always the danger of missing some possible explanation, of not noticing what may turn out to be the real cause. Therefore, when all possible solutions in a disjunctive syllogism have been rejected except one, and this last one is recognized as true, in order for the hypothesis to become a scientific theory, it is required not only that all other hypotheses about the same phenomenon turn out to be false, but also that the given hypothesis be tested in all possible ways and find its positive confirmation in the maximum amount of factual material .

From the above it is clear that the study of the phenomena of objective reality, the discovery of their causal relationships is not reduced to formal logical operations by means of deductive and inductive inferences. The basis of the study is the method of materialistic dialectics, which makes it possible to know objective reality in all the connections and interdependence of its phenomena, to single out the main and essential in these phenomena, to reveal their patterns. But logical methods of using hypotheses, like all methods of deduction and induction, are auxiliary means of knowing objective reality, contributing to the correctness of the thought process and the rejection of false assumptions and conclusions.

§ 9. ANALOGY

A special type of inductive inference is *analogy*.

In logic, analogy is an inductive inference in which, from the similarity of two objects in some features, a conclusion is made about the similarity of these objects in other features. This means the following.

We are considering two phenomena. We have studied one phenomenon, we know all its features; in the other phenomenon we know not all, but only some features, the rest are unknown to us. We compare these two phenomena with each other. If it turns out that the features of the second phenomenon known to us are similar to the corresponding features of the first phenomenon, all the features of which are known to us, and these similar features are essential, important, then we conclude that the remaining features of the second phenomenon, unknown to us, will be the same as the features of the first phenomenon. The formula of analogy will be as follows:

$$A - a, b, c$$
$$B - a, b, x$$
$$x - s$$

We have two phenomena — *A* and *B*. The features of *A are a, b, c*. Phenomenon *B* has the same features—a and b—and one more feature that we do not know; let us designate it by *x*; *B—a, b, x*. We see that the two known features of the second phenomenon coincide with the two corresponding features of the first phenomenon. We conclude that *x—c*, i.e. that the remaining, unknown feature of the second phenomenon coincides with the feature of the first phenomenon.

Let's take an example. Let's compare two planets — Earth and Mars. We know all the features of Earth, but some of the features of Mars are known and others are unknown. Mars, like Earth, rotates on its axis and around the Sun, Mars, like Earth, is surrounded by an atmosphere, Mars, like Earth, has water, and a number of other important features of Mars coincide with the features of Earth. From this we conclude that, since the conditions on Mars are in many ways similar to the conditions on Earth, there must be life on Mars, as on Earth, and people may live on Mars. This is an inference by analogy. From the similarity of some features of Mars known to us with the features of Earth, we draw a conclusion about other, unknown to us, features of Mars, namely, that it is inhabited by living beings.

Inference by analogy is an inductive inference, since in it the conclusion extends to objects not contained in the premises, and is a conclusion from known characteristics of objects to their unknown characteristics, which is characteristic of induction.

As we know, induction is the extension of information about known facts to unknown facts. The same is true of analogy, in which such facts are the belonging of objects to certain characteristics. From such known facts as the population of the Earth by living beings, the presence of an atmosphere on the Earth and Mars, etc., we draw a conclusion about a new, unknown fact—the population of Mars by living beings. In making such a conclusion, we go beyond the premises that do not contain such a conclusion (as in deduction), but lead us to such a conclusion (as in induction).

Conclusions in inferences by analogy are always only approximate, probable, but not entirely accurate and not entirely reliable. Inference by analogy is not scientific induction. Inference by analogy cannot be stopped in research and completely relied upon. Inference by analogy can be used only to outline the paths of further research, *to build a hypothesis*, and then this hypothesis must be thoroughly investigated and verified.

An inference obtained by analogy is always only a problematic judgment—probably *S* is *P*. This inference can only be considered as probable, as a hypothesis, as a supposition, but in no case as a categorical judgment. And indeed, no matter how tempting the conclusion that people live on Mars, and no matter how probable it is, it cannot be said with certainty, because this is an inference only by analogy: we do not know all the conditions that exist on Mars.

We have spoken of analogy *as a form of inductive reasoning* , in which from the similarity of objects in some features we conclude their similarity in other features. In all such cases, a conclusion by analogy can only be more or less probable, but not reliable, and therefore cannot serve as proof. But *the concept of analogy has another meaning.* We can speak of an analogy between objects or phenomena in the sense that both of them fit into a common position in such a way that the same consequences follow from this common position for them. In this case, the objects or phenomena being compared have a similarity, but this is not simply their similarity in some features, from which their similarity in other features is deduced, but this is a similarity conditioned by their belonging to the same class of phenomena. If both objects or phenomena being compared belong to the same class, which has a certain feature, then with respect to both objects or phenomena we can conclude that this feature belongs to both of them. From this it is clear that such an analogy is not an inductive, but a deductive inference, a syllogism, and is based on the axiom of the syllogism dictum de omni: everything that is said about a class of objects also applies to each individual object of that class.

Let us give an example. At the General Assembly of the United Nations, the head of the Soviet delegation, A. Ya. Vyshinsky, insisting that the use of atomic weapons be prohibited, drew an analogy between the prohibition of atomic weapons proposed by the Soviet delegation and the prohibition of asphyxiating gases, which was adopted in 1925 (Geneva Protocol).

Objecting to those who claimed that the prohibition of atomic weapons was impossible, the Soviet delegate pointed out that gas weapons were prohibited at one time, therefore it is entirely possible to prohibit atomic weapons as well, since there is a complete analogy here[1]. The analogy here is indeed complete, and the conclusion of the Soviet delegation is logically consistent and irrefutable. The analogy between the prohibition of gas and atomic weapons lies in the fact that both weapons are inhumane means of warfare, the use of which contradicts elementary moral concepts. Since such a conclusion has already been made with respect to gas weapons, it cannot but be made with respect to atomic weapons, the use of which entails even greater disasters than the use of gas weapons. The deductive nature of such a conclusion is completely clear: the conclusion is made not simply from the similarity of two phenomena in some features, but from a general principle, a general position, from which the same consequences follow for both compared phenomena.

§ 10. RELATIONSHIP BETWEEN INDUCTION AND DEDUCTION

As already indicated, the significance of induction in our thinking is very great. In inductive research we rely on experience, on facts. A necessary condition for induction is a thorough study of facts, observation, experiment.

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[1] See Izvestia, October 15, 1948.

Deduction has a different character. Deductive reasoning requires ready-made, recognized as true propositions—premises, from which a conclusion is drawn that necessarily follows from them. Thus, deductive reasoning itself is not directly connected with empirical research.

Of course, deductive reasoning, divorced from experience, unconnected with human practice, will be an empty game of concepts and will be devoid of any cognitive value. But experience and practice lie beyond the limits of deductive reasoning itself as such, taken in isolation: after the premises are given, the reasoning itself consists of analysing and connecting these premises.

Bourgeois logicians fundamentally distort the real relationship between deduction and induction. Thus, a number of bourgeois scientists of the 19th century metaphysically opposed induction to deduction. They either assigned deduction a secondary place, or completely denied its independent significance. For example, J. S. Mill considered the entire process of logical thinking as inductive; deduction, in his opinion, is only a moment of induction; thinking always proceeds from particular to particular, and general propositions, which constitute the major premises of syllogisms, are only mental “records” or “notes” on many observed particular facts, which are formulated in the form of a general rule, a general proposition only in order to better retain these particular facts in memory.

The philosophical basis of this view is positivism, which is a variety of idealism and is characterized by superficial and vulgar empiricism. This point of view on induction was sharply condemned by Engels. Engels ironically called the immoderate admirers of induction “all-inductivists” and pointed out that “the whole bacchanalia with induction [comes] from the English.” Engels, further, wrote: “No induction in the world could *ever* help us to understand the process of induction. Only *an analysis* of this process could do this. Induction and deduction are connected with each other in the same necessary way as synthesis and analysis. Instead of one-sidedly extolling one of them to the skies at the expense of the other, we must try to apply each in its place, and this can be achieved only if we do not lose sight of their connection with each other, their mutual complementarity”[1].

In the latest studies of logic by bourgeois authors, the opposite view is sometimes observed: the entire process of thinking is considered deductive, and induction is relegated to the background; sometimes the idea is expressed that induction is either a disguised deduction or a simple guess. This reflects the revival of scholastic views in bourgeois philosophy and logic, the desire to lead thinking away from objective reality into the realm of empty, unscientific abstractions.

Both of these opposing concepts of “all-inductivism” and “all-deductivism” have no scientific basis. The correct solution to the question of the relationship between deduction and induction lies in recognizing the importance of both, since both deduction and induction are important for correct thinking and fruitful scientific research. Deduction and induction are inextricably linked with each other and complement each other. The expanded process of scientific thinking always includes both deduction and induction, and is not limited to just one of them.

[1] *F. Engels* , Dialectics of Nature, pp. 182-183.

Induction alone without the aid of deduction can never lead a study to completely reliable conclusions; a conclusion obtained by inductive reasoning will always be only probable, approximate, but can never be reliable, indubitable. Induction alone, induction alone, is always to a greater or lesser extent induction through simple enumeration. If we study a very large number of objects of a given class, find constancy of features in all of them, discover a stable connection in them and find no exceptions anywhere, our conclusion about all the objects of this class may be to one degree or another probable, but only probable, and not reliable, since we have not studied all the objects of this class. Scientific induction leads us to reliable conclusions, but, as we know, scientific induction is truly scientific not only because the study is carried out systematically and methodically, but also because it is connected with deduction, includes in the process of study deduction, establishing the necessary nature of the connection between phenomena and their features.

By induction we generalize the features of a number of facts, cases, and from the generalization of the features of individual facts, cases we derive a general rule. But no matter how many particular cases, facts we study, all this will be the sum of particular facts, and no general rule will come out of this: it can be assumed, but it cannot be asserted with certainty. We said that induction is a conclusion from facts known to us regarding facts that are unknown to us. What gives us the right to draw a conclusion from a certain number of facts of a given kind regarding all facts of a given kind? This is the fundamental question of the theory of induction. What gives us the opportunity to move from a multitude of particular cases to a general rule and from the properties of a number of facts observed by us to conclude about the properties of the remaining facts of the same kind that we have not observed? Without deduction this would be impossible. We would only accumulate individual facts, but the conclusions from them in their reliability would not go further than hypothesis and analogy.

Engels pointed this out when he said that induction itself can never help to clarify the process of induction itself (see above, p. 318).

But if scientific induction is impossible without deduction, then deduction is impossible without induction. To make a deductive inference, i.e. to arrive at one or another conclusion by the method of syllogism, two premises are required — a major and a minor, and then, according to the rules of syllogism, we can draw an infallible conclusion. But the premises themselves are not given to us ready-made, they themselves must be found, clarified, established. The major premise of a syllogism can be an axiom, i.e. a self-evident proposition that does not need proof; in this case, induction does not directly participate in the creation of the major premise; however, all axioms, mathematical and others, ultimately have an empirical basis and are generalizations of human experience.

But axioms are rarely the major premise of a syllogism (except in mathematics); usually the major premise of syllogisms are various general propositions, and in the establishment and formulation of which inductive generalization takes part in one way or another. Induction plays a similarly significant role in establishing the minor premise of a syllogism, especially in cases where the minor premise is a single (individual) judgment containing a statement about a separate concrete fact; in this case, such methods as observation, testimony, and experiment are absolutely necessary. Thus, deduction without induction is just as impossible as induction without deduction. Deduction without induction would inevitably have a scholastic character, as it was in medieval logic.

The development of induction does not in the least diminish the role of deduction. In the correct conduct of scientific research on any issue, deduction and induction are inseparable from each other. This does not eliminate the fact that in different sciences the ratio of the method of induction and the method of deduction may be different. For example, mathematics mainly uses the method of deduction, and chemistry — to a greater extent the method of induction. But nowhere, in no area of human knowledge can deduction exist without induction, just as induction cannot exist without deduction.

Deduction and induction are auxiliary methods for dialectical thinking, for understanding objective reality through the application of the method of materialistic dialectics, which uses both induction and deduction, but is not exhausted by them, is not reduced to them.

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We have completed our consideration of inferences by examining induction. As we have seen, in the form of inferences, thoughts are developed, new judgments are derived from some judgments. Any inference, deductive or inductive, is characterized by the fact that from some thoughts expressed in the premises, we derive another, new thought, expressed in the conclusion. Thus, in inference, thought develops from premises to conclusion, deduction. In any inference, deductive or inductive, the premises are *the basis* from which the conclusion is drawn, and the conclusion is *the consequence*, following from the premises as from the basis. Thus, the premises of an inference relate to its conclusion as a basis to a consequence. Inference is reasoning from premises to conclusion, from a basis to a consequence: we are given premises as a basis, and from them we derive a conclusion as a consequence.

But there may be reasoning of a different nature. We already have a certain thought expressed in a judgment, we have formulated a certain position, but we need to be convinced of its truth and establish its truth in such a way that others agree with our point of view, so that they are convinced of the truth of our thought. In other words, we need to *prove our thought*. In this case, the course of reasoning will be different than in an ordinary inference: for our thought we will seek and formulate *a basis* from which this thought follows as *a consequence*, i.e. the reasoning will not go from basis to consequence, as in inference, but from consequence to *basis*. Such reasoning, in which the truth of a thought is established by providing a basis from which this thought follows as its consequence, is called *proof*. We will now proceed to consider logical proof.

Chapter XII. EVIDENCE

1. Definition of logical proof. 2. Composition of logical proof. 3. Deductive and inductive proofs. 4. Direct and indirect proofs. 5. Rules of proof. 6. Proof of a particular fact based on other particular facts. 7. Defence and refutation. 8. Methods of refutation. 9. Proof negative provisions . 10. Evidence "To truth", "to the person" and "to the public". 11. The meaning of proof in logic.

§ 1. DEFINITION OF LOGICAL PROOF

Proof is the establishment of the truth of any judgment by means of citing other judgments, the truth of which, that is, their correspondence to objective reality, is undoubted and from which the truth of the given judgment follows.

We need to establish some position and convince others that this position is correct. In any thought process, in scientific research, in disputes on any topic, we always have to put forward different positions and prove them. We think, we are sure, we assert that things are so and so, but if we assert something, then we must prove the correctness of our assertion. We can prove any position by deducing what we assert from positions whose truth is indisputable. This is the obligatory and only way of any proof.

Axioms, i.e. general propositions whose truth is recognized without proof, do not require proof (see Chapter II, § 5). Those of our judgments concerning individual facts, events, and objects whose truth is obvious and directly confirmed by our senses do not require proof either. For example, "if I say: 'it's cold today', 'it's dark now', 'the tea is hot', etc., then there is usually no need to prove such statements; they can be verified by direct perception."

But when we are dealing not with axioms and not with immediate evidence, but with various statements, thoughts, the correctness of which must be substantiated, established, this can only be done through proof.

Any inference, deductive or inductive, can serve the purposes of proof. When we draw a conclusion from true premises, we thereby prove the truth of this conclusion. Nevertheless, proof is a special, independent logical technique, although it is clothed in the form of an inference, which will be discussed below.

Let us give examples of proof. I assert that iron is fusible. This is proved by the fact that iron is a metal, and all metals are fusible; from these judgments, the truth of which is beyond doubt, it follows that iron is indeed fusible. I assert that this man showed himself to be a valiant defender of the homeland during the Great Patriotic War. I prove this by the fact that this man was at the front during the war, where he was awarded the Order of the Red Banner and the Order of the Patriotic War, 1st degree; and such orders are given at the front specifically to valiant defenders of the homeland. From this it follows that he is indeed a valiant defender of the homeland.

From these examples it is clear that proofs in logic are connected with the fundamental law of thinking—the law of sufficient reason. The law of sufficient reason requires that every proposition, assertion or denial, be justified. Every thought can be considered true only if it has a sufficient reason. *Proof in logic is an* *indication of a sufficient reason for any of our judgments*. In other words, to prove something means to provide a sufficient reason for what is being proved.

The term “proof” is constantly encountered in our speech, in various fields of science and practice, and has several different meanings.

The first meaning of the term “proof” is as follows. Evidence is a source of *information about a fact* or, in other words, the method by which a fact or another is established. This is the meaning of the concept of proof in law, in jurisprudence. For example, a receipt for money issued by a certain person is *proof of* the actual receipt of this amount of money by this person; the testimony of a witness who saw a certain person commit a crime is *proof of* the commission of a crime by this person. The concept of proof in historical sciences has the same meaning. For example, the testimony of contemporaries (memoirs) and other historical monuments are recognized as evidence of various historical events.

The second meaning of the concept of proof is as follows. Proof is any fact from the existence of which one can draw a conclusion about the existence or non-existence of another fact. We also encounter this understanding of proof in jurisprudence and in historical sciences. For example, the fact that when Napoleon I, exiled to the island of Elba, returned to France in March 1815, the troops and population went over to his side, serves as proof that the army and the people were hostile to the restoration of the Bourbon dynasty, which was imposed on France by foreign states.

The third meaning of the concept of proof is as follows. Proof is understood as the reasoning itself, *in which the truth or falsity of some assertion is* *established, the connection of thoughts leading to a certain conclusion regarding the truth of this assertion.* In this sense, proof means the same as argumentation, i.e., providing evidence to confirm some thought; proving the correctness of this thought.

This meaning of the concept of proof exists in mathematics (proof of some theorem), and it has the same meaning in logic.

In logic, proof does not mean facts from which conclusions are drawn about other facts, nor sources from which information about facts is obtained. *In logic, proof means the thought process of substantiating a proposition.* The course of reasoning, the connection of judgments that are given to establish the truth of a proposition, the substantiation of some judgments whose truth is unclear with the help of other judgments whose truth is certain, the presentation of arguments to confirm the correctness of a thought—that is what proof is in logic.

This does not mean that logic operates with some special concept of proof that is not applicable to proofs in other sciences. The logical concept of proof as the deduction of the truth of one judgment from other true judgments is applicable in all sciences (natural, historical), but since the concept of proof has several meanings, it can sometimes be applied in other meanings, in addition to the one accepted in logic.

§ 2. COMPOSITION OF LOGICAL PROOF

Every logical proof consists of three parts: 1) thesis, 2) arguments and 3) demonstration.

A thesis is a judgment whose truth must be proven.

Arguments are those judgments that are given in support of a thesis as its sufficient basis.

Demonstration is the derivation of a thesis from arguments, that is, those judgments that show why these arguments justify this particular thesis.

So, all logical proof consists of a thesis, arguments and demonstration. The thesis is what *needs* to be proven, the arguments are what *proves* the thesis, and the demonstration is the judgments that explain why the thesis is proven by arguments and follows from them. Any proof will be convincing, weighty, correct only under the obligatory condition that all three of its parts are clearly defined and delineated. If it is unclear what is being proven, or what the assertion being proven is based on, or why the correctness of what is being proven follows from the arguments, then the entire proof loses its force. In our speech, in our everyday or scientific thinking, we will not always find such formally delineated thesis, arguments and demonstration. But we must keep in mind the following: if the three parts of the proof are not always directly delineated in their verbal expression, then from the point of view of the logical meaning of our reasoning, the proof must always have a thesis, arguments and demonstration, and at any moment in a given reasoning, in the chain of these judgments, we can single out the thesis, arguments and demonstration. This is very easy to do, because all three parts of the proof answer different questions. *The thesis answers the question "what", i.e. what is being proven; arguments answer the question "by what", i.e. what is the thesis being proven by; demonstration answers the questions "how, why", i.e. in what way, why exactly do the arguments prove the thesis.*

§ 3. DEDUCTIVE AND INDUCTIVE PROOFS

In accordance with the division of inferences into deductive and inductive, proofs are also divided into deductive and inductive. Every proof is a special kind of inference, which differs from ordinary inference in that in a proof the thought moves in the opposite direction than in an inference. The arguments in a proof correspond to the premises of the inference, and the thesis in a proof corresponds to the conclusion in the inference. In an inference, *premises are given* , and we look for the conclusion that follows from them. In a proof, *a thesis* (i.e., a conclusion) is given, and we look for arguments (i.e., premises) that confirm it.

According to the very nature of deduction, *deductive proof* in its typical form consists of deducing a particular case contained in the thesis from a general rule contained in the arguments. In other words, in deductive proof, the arguments contain a general rule, and the thesis is a particular case that is deduced from this general rule. Therefore, deductive proof consists of proving a circumstance related to a particular case using a general rule.

A deductive argument always takes the form of a syllogism. The arguments are the premises, and the thesis is the conclusion. The thesis must follow from the arguments just as in a syllogism the conclusion follows from the premises .

Let us give examples of deductive proof. V. I. Lenin wrote in his work “Three Sources and Three Component Parts of Marxism” (1913): “The teaching of Marx is omnipotent because it is true.”[1] The thesis in this proof is that Marx’s teaching is omnipotent, the arguments are that Marx’s teaching is true, and the true teaching is omnipotent (the second argument is not stated but implied). In the form of a syllogism, these positions are expressed in the following way: the true teaching is omnipotent, Marx’s teaching is true, therefore Marx’s teaching is omnipotent.

Another example. We assert the thesis: in order to eliminate the misfortunes and sufferings that workers experience in capitalist society, we must destroy capitalism itself. The arguments supporting this thesis are as follows: in order to eliminate the misfortunes and sufferings of workers in capitalist society, we must destroy their cause, and this cause is capitalism itself. It is not difficult to see a syllogism in this reasoning: in order to eliminate the misfortunes and sufferings of workers in capitalist society, we must destroy their cause (major premise), the cause of these misfortunes and sufferings is capitalism itself (minor premise), therefore, in order to eliminate the misfortunes and sufferings of workers in capitalist society, we must destroy capitalism itself, the capitalist social system (conclusion).

Deductive proof of any proposition does not always fit into the framework of one syllogism, often this is not

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[1] *V. I. Lenin*, Works, Vol. 19, ed. 4, p. 3.

enough, a chain of proofs and, accordingly, a chain of syllogisms (polysyllogism) is needed. We need to prove some thesis. We look for arguments, but we see that these arguments themselves need proof. Then we make each argument a thesis of an independent proof and look for arguments for it. Perhaps these “arguments of arguments” also need proof, because their truth is not obvious; then we will look for arguments for them as well. In this way, we will move further and further away from the thesis until we reach arguments that do not need to be proven, since their truth is beyond doubt. After this, we will go in the opposite direction, back to the main thesis, and from the arguments we will deduce the truth of the thesis itself. Thus, the process of proof will be divided into several separate proofs, and each separate proof will take the form of a syllogism.

Usually a deductive proof takes the form of a categorical syllogism, but it can also take the form of a hypothetical syllogism, in which we deduce the truth of the consequence from the truth of the premise. Thesis: *C* is *D*; arguments: if *A* is *B* , then *C* is *D*); in this case, *A* is *B*, therefore *C* is *D*). For example, “this iron has increased in volume (thesis) because it is very hot, and if iron is heated, then it increases in volume (arguments).” This is a hypothetical syllogism, the structure of which, as with any proof, is, as it were, inverted: we go from the thesis to the arguments, i.e. from the conclusion to the premises, whereas in a syllogism we go from the premises to the conclusion. A correctly conducted deductive proof is completely reliable, the truth of the thesis is proven beyond doubt. Indeed, if the arguments are true and the truth of the thesis follows from the truth of the arguments according to the rules of syllogism, then the thesis will be true, the proof will be completely reliable.

Inductive proof consists of deducing from particular cases contained in arguments a general proposition contained in the thesis, or, in other words, in an inductive proof the arguments contain particular facts, and the thesis contains a general proposition.

We need to prove some general proposition on the basis of a number of particular facts; if we assert some general rule and we are asked on what basis we assert it, and we cite a number of facts in support of this general rule, then this will be an inductive proof.

For example, the following statement is made: all predatory animals can be trained. This is a thesis. Many well-known cases where various predatory animals have been successfully trained can be cited as arguments. Inductive proof takes the form of inductive reasoning, carried out in reverse order — from a general rule (serving as a thesis) to particular cases (serving as arguments). In ordinary inductive reasoning, a number of particular cases are given and a general proposition is derived from them. In inductive proof, a general proposition (thesis) is given and particular cases (arguments) are sought to confirm it.

According to the very nature of induction, inductive proof is not completely reliable; the thesis is proven with probability (more or less high), but not with complete certainty. In order to prove a thesis with complete certainty, inductive proof must be combined with deductive proof.

§ 4. DIRECT AND INDIRECT EVIDENCE

In addition to the above-discussed division of evidence into deductive and inductive, evidence is divided into direct and indirect.

Direct proof is a proof in which the arguments directly prove the truth of the thesis. This means that in all cases where we present arguments that confirm the correctness of the thesis, we have direct proof.

Everything that was said above (in the proofs) refers to direct proofs—the truth of the thesis follows from the arguments according to the rules of logical inference.

Indirect proof is proof that proves the truth of a thesis by the falsity of a judgment that contradicts the thesis. A judgment that contradicts a thesis is called an antithesis. Therefore, it can be said that *indirect proof is proof that substantiates the truth of a thesis by proving the falsity of the antithesis.*

Let us assume that we do not have arguments that would directly prove the truth of a given thesis. But we do have arguments that prove that a judgment that contradicts the thesis is false. We prove this, and from this, according to the law of the excluded middle, it follows that the thesis is true. This is indirect proof.

The process of proof in indirect proof is as follows. I want to prove the thesis that *A* is *B*. I do not have sufficiently convincing arguments from which it would directly follow that *A* really is *B*. I take the antithesis, i.e. the judgment *A* is not *B that contradicts the thesis*, assume it to be true and deduce from it all the ensuing consequences. These consequences turn out to contradict reality, to be false, and this proves the falsity of the antithesis, i.e. the judgment that *A* is not

B. But if the judgment A is not B is false, then, according to the law of the excluded middle, the contradictory judgment *A* is *B is true*, which is what had to be proved. This is indirect proof. The technique used in indirect proof—proving the falsity of a judgment (antithesis) by deducing from it consequences that turn out to be false—is called in logic reduction to the absurd (reductio ad absurdum). This kind of indirect proof is used in mathematics, where it is usually called *proof by contradiction;* it would be more correct to say "by contradiction", since the falsity of a contrary judgment does not prove the truth of another contrary judgment, whereas the falsity of one contrary judgment undoubtedly proves the truth of another contrary judgment .

Thus, if it is necessary to prove that in a triangle in which two angles are equal, the sides opposite to them are also equal, the proof is conducted by contradiction (i.e., contradictory), the antithesis is accepted as true that these sides are not equal, and from this follow false consequences that contradict the recognised theorems of geometry; but if it is not true that these sides are not equal, then it is true that they are equal, which is what was required to be proved.

Another form of indirect proof is proof by excluding all but one member of a disjunctive proposition. This can be represented as follows. We have a proposition: *A* is either *B* , or B_1 , or B_2. Such a proposition is called disjunctive. It has one subject and three predicates, but only one of these predicates can refer to the subject. We need to prove that *A* is *B*. If we could give arguments that *A* is *B*, this would be a direct proof, but we do not have them. Then we prove that *A* is neither

B_1 nor B_2, from this it follows that *A* is *B*. This is indirect proof[1].

§ 5. RULES OF PROOF

Logical proof follows a number of rules.

The first rule. The thesis must be a clear and precisely defined judgment. If the thesis, i.e. what is to be proven, is not precisely defined, if we have not clarified what exactly we are going to prove, the proof will be flawed. It is necessary to be precisely clear to ourselves what we are proving. Violation of this rule of proof is not an uncommon occurrence in our thinking, in our everyday life. Sometimes a speaker at a meeting presents and develops his thoughts, cites facts and considerations about them, speaks to the essence of the issue, so that everything seems in order. However, listening and thinking about the content of the report, we sometimes become perplexed: what, in fact, does the speaker want to prove, where is he leading his reasoning, what does he want to convince us of? Everything that the speaker says may be true, but it is not known what the main idea is that he wants to prove. In this case, obviously, the thesis itself is not defined, what needs to be proven is not established, and therefore all the considerations presented in the report, perhaps interesting and true in themselves, lose their meaning.

During an argument, the disputants, disagreeing with each other, each put forward their own positions

[1] For examples see Chapter X (§ 10. Disjunctive syllogism).

and try to prove them. The argument sometimes takes on a heated character. But listening, thinking about the content of the argument, sometimes we involuntarily ask the question: what, in fact, is the argument about, what does each disputant want to prove ? Upon closer examination, it turns out that there is nothing to argue about: both disputants prove the same thesis, they agree with each other, but since the thesis is not defined, not formulated precisely, the appearance of divergence, disagreement arises. Sometimes it happens that both disputants prove completely different theses, talk about different things, so that again there is nothing to argue about, both are right (or wrong), the thesis of one does not contradict the thesis of the other.

The second rule. *The thesis must remain identical, that is, one and the same, throughout the proof*. As stated above, proof is not always reduced to simply formulating a thesis and presenting arguments from which the thesis follows, as from premises. Quite often, the arguments themselves have to be proven. *And* then, in a number of cases, the demonstration may consist of a fairly complex reasoning in which the arguments are examined in detail and considerations are given by virtue of which the thesis is deduced from the arguments. Thus, proof can be a very complex and lengthy process of thinking, discussion, research. Therefore, it may happen that in the very process of proving a thesis, when we are distracted from it to analyse the arguments, consider objections to the thesis, etc., the thesis itself may change unnoticed by us, we may forget the exact wording of what we are proving, we may deviate from the thesis, and as a result it turns out that we have proven not what we intended to prove, but something else.

This deviation from the original thesis is a very significant logical error, which is called ignoratio elenchi. This expression in Russian literally translates as ignorance of the argument, but in *meaning* it means substitution *of the thesis in the proof*.

Having started to prove one position, we then, in the course of the proof, begin to prove another, similar to it. In other words, in the process of proof, what needed to be proved changes, instead of one position another is proved.

Of course, it is quite possible to have proofs in which we ourselves become convinced that the thesis we have put forward is incorrect, that we need to prove not this thesis, but another one. In such a case, we must replace the original thesis with another one, but this can only be done in this way: reject the incorrect thesis, discard it, put forward a new thesis and begin to prove it anew. In this case, there will be no ignoratio elenchi. If we do not *replace* the old thesis with a new one, but *replace* it unnoticed by ourselves or by our interlocutor, and, having proved a thesis other than the one we started to prove, we claim that we have proved it, this will be ignoratio elenchi, a very serious logical error.

Just as a deliberately incorrect conclusion is a sophism, so is a deliberately incorrect proof, calculated to substantiate a false position, to give it the appearance of persuasiveness. Such sophisms in proofs are usually observed when the thesis is substituted; the position under consideration is replaced by another, which is then presented as the subject of the dispute. Such sophisms were widely used by opportunists, traitors to the cause of the working class, who were exposed by V. I. Lenin and I. V. Stalin.

In 1915, V. I. Lenin published an article, “The Sophisms of the Social-Chauvinists,” in which he exposed Kautsky and the Russian liquidator *A.* Potresov. During the First World War, Kautsky supported the German government, while the Russian social-chauvinists supported the tsarist government. Defending the policy of socialists supporting “their” governments and the bourgeoisie, Kautsky argued that the majority of the population saw the reason for the war in the enemy’s malice and sought to protect the borders from the enemy; those who tried to prevent the sending of troops to the borders would be killed by an enraged crowd.

Lenin wrote on this subject: “Kautsky himself saw very well back in 1911 that the government (and the bourgeoisie) would *deceive* the ‘people, the population, the crowd’, blaming the ‘malice’ of another country. The question is whether support for such deception—whether by voting for credits, in speeches, articles, etc.—is compatible with internationalism and with socialism, or whether this support is equivalent to a national-liberal labour policy. Kautsky acts like the most shameless ‘advocate’, like the last sophist, replacing this question with the question of whether it is reasonable to ‘prevent individuals’ from sending troops’ against the will of the majority of the population, deceived by their government. That is not the point of the debate. That is not the essence. The deceived petty bourgeoisie must be dissuaded, the deception must be explained to them; sometimes, having gone to war with them, one must be able to wait for their heads to be worked on by the experience of war. This is not the point at issue, but whether it is permissible for socialists to participate in the deception of the "people" by the bourgeoisie. Kautsky and A. Potresov justify such deception. For they know perfectly well that the "malice" of the governments and bourgeoisie of all the "great" powers, England, France, Germany and Russia, were equally to blame for the imperialist war of 1914. This is clearly stated, for example, in the Basle Resolution of 1912"[1].

The deliberate fraudulent substitution of the thesis with social-chauvinism is obvious. This is an ugly and shameless sophism with which the social-chauvinists tried to cover up their betrayal of the cause of the working class in the predatory imperialist war.

Third rule: The arguments given in support of the thesis must be true and beyond doubt.

Arguments are reasons given to prove the truth of a thesis, and these reasons themselves must be true. Indeed, if the arguments are false or dubious, then the proof will be false or unconvincing.

The most serious error that consists in violating this rule of evidence is *the fundamental fallacy* (error fundamentalis). This error consists in the fact that in support of the thesis, a false, incorrect statement is given as the main argument (usually the major premise). Consequently, the initial position is false, and therefore the conclusion, i.e. the thesis, cannot be considered proven.

For example, the main error of various proofs in astronomy before Copernicus was the false argument that the Sun revolves around the Earth.

[1] *V. I. Lenin*, Works, Vol. 21, ed. 4, p. 161.

The fundamental error of proof in all bourgeois idealistic philosophical systems is the false initial position about the primacy of consciousness and the secondary nature of matter.

But even in addition to the falsity of such a general basic initial position, an error in proof may simply consist in the incorrectness of one or another argument cited in support of the thesis. We know that the falsity of the basis does not mean the falsity of the consequence; with a false basis, the consequence may still be true if it follows from another true basis. Therefore, the falsity of an argument does not always mean the falsity of the thesis, but with a false argument, the thesis always remains unproven, unclear, doubtful, and debatable. Therefore, only true arguments should be cited, since only from them can the truth of the thesis be deduced with certainty.

Another logical error, called decision , is also associated with the violation of the rule of proof under consideration. pripsiriii, which in Russian means anticipation of the basis. This error consists in the following: *as an argument confirming the thesis, a position is given that itself needs to be proven.* In other words, we prove the thesis with the help of something that itself still needs to be proven.

We already know that if the argument used to confirm a thesis itself raises doubts, it must be made into an independent thesis, proven, and only then used as an argument to prove the first, main thesis, pripsirii consists in the fact that a position is taken that has not yet been proven, is doubtful, the truth of which has not been established, and it is presented as an argument, presented as true, proven, and indubitable.

Thus, for example, Aristotle proved that the universe is limited, has an end, by the following arguments: if the universe had no boundaries, it would not have a definite centre; but all bodies tend to the centre of the Earth, which is in a definite place and is the centre of the universe. Therefore, the universe is limited. Here the argument is given that the centre of the Earth is the centre of the universe, a position whose truth was not proven at that time and which is generally impossible to prove, since it is false.

In all cases where unverified data or unestablished facts are provided to support any idea, petitio is allowed principles .

Fourth rule. Arguments must be a sufficient basis for the thesis . Arguments are related to the thesis as a basis is related to a consequence: from the truth of the basis, i.e. the arguments, follows the truth of the consequence, i.e. the thesis. As we indicated above, proof is based on the law of sufficient reason: the thesis must be based on arguments, with the necessity of following from them.

There are cases when arguments are given in support of a thesis that are correct in themselves, but are not a sufficient basis for the thesis, and do not substantiate it. Such an error in proof is designated in Latin by the expression non sequitur—"does not follow", "does not follow", i.e. the thesis does not follow from the arguments presented to support it.

In his work "On the Junius Pamphlet," Lenin, criticizing this author's assertion that in the era of imperialism there can be no national wars, wrote: "Only a sophist could erase the difference between an imperialist and a national war on the grounds that one *can* turn into the other."[1] A national war can turn into an imperialist war, and an imperialist war into a national war—this is true, but this is not an argument in support of the thesis that there is no difference between an imperialist and a national war; this thesis does not follow from this argument and is essentially false.

A serious violation of this rule of proof is the logical error called *the fallacy of taking something said in a relative, conditional sense and saying it irrespectively, in an absolute sense* (fal lacia a dictu second quid ad dictum simpliciter). This error consists in the following: some proposition is true in the presence of a certain condition, under certain circumstances, but in the proof it is cited as an argument as being true unconditionally, under all circumstances.

This error is extremely dangerous; it can lead to completely false conclusions in a wide variety of theoretical and practical issues.

Let us give an example. Engels in Anti-Dühring asserted: "When there are no more social classes to be kept in subjection, when there is no domination of one class over another... then the need for state power will disappear..."[1] After the liquidation of the exploiting classes in the USSR, some people wondered whether we now needed the state, whether it was dying out, and whether we should not contribute to its dying out, since in the USSR there were no more classes hostile to the workers and there was no one to suppress.

In his report to the 18th Party Congress, Comrade Stalin said the following about this:

"Is this position of Engels correct?

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[1] *V. I. Lenin*, Works, Vol. 22, ed. 4, p. 295.

[1] *F. Engels*, Anti-Dühring, p. 264.

Yes, that is correct, but under one of two conditions: a) *if* we study the socialist state from the point of view of only the internal development of the country, abstracting in advance from the international factor, isolating the country and the state from the international situation for the convenience of research, or b) *if* we assume that socialism has already won in all countries or in most countries, instead of a capitalist environment there is a socialist environment, there is no longer a threat of attack from outside, there is no longer a need to strengthen the army and the state"[2].

Comrade Stalin pointed out that "it is impossible to extend Engels' general formula about the fate of the socialist state in general to the particular and specific case of the victory of socialism in one, separate country, which has a capitalist environment around it..." [3]

Not only the liquidation of the exploiting classes, but also the construction of communism in the USSR will not lead to the withering away of the Soviet state, as long as our country remains in a capitalist encirclement. Thus, all arguments about the uselessness of the Soviet socialist state, about its allegedly already beginning withering away, are incorrect and harmful, and they are incorrect from the logical side: the logical error consists in the fact that Engels' position, correct under certain conditions, was declared correct in general, everywhere, under all conditions.

Of course, in such a case we are not talking about a simple logical error in the proof, but about a distortion or misunderstanding of Marxism-Leninism, and in the

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[2] *J. V. Stalin*, Questions of Leninism, 11th ed., p. 602.

[3] Ibid., p. 603.

past such statements were propagated by enemies of the people in order to weaken and undermine the Soviet state. But Lenin and Stalin never missed the opportunity to expose logical errors, violations of the rules of logical thinking, and logical contradictions in the reasoning of enemies and vulgarizers of Marxism.

A variation of the logical error under consideration is the following: *a position that is correct in principle, in general terms, is considered as correct in all individual cases without exception.*

The essence of this error is as follows. Any position is correct in principle, basically, it characterizes the state of affairs in a given area. But this does not mean that this principle is always realized, in all particular cases without exception. If, proceeding from this principle, we assert that all particular cases are exactly as expressed in principle, we will make a mistake that can lead to false conclusions. Such a mistake will be evident, for example, in the following proof: citizen N. is an advanced scientist, since he is a scientific worker, and scientific workers in the USSR are advanced scientists. The fact that scientific workers in the USSR are advanced scientists is an absolutely correct, true position, but it does not follow from it that any individual scientific worker is such: this particular scientific worker may be backward, frozen in outdated positions or adhere to false, bourgeois concepts, or may simply not be knowledgeable enough.

Rule 5: Arguments must be judgments whose truth is proven independently, independent of the thesis.

The truth of the thesis in a proof must follow from the truth of the arguments, but the truth of the arguments must be established independently, independently of the thesis. The thesis is derived from the arguments, but the arguments themselves cannot be derived from the thesis, but must be either self-evident or derived from other judgments whose truth is beyond doubt.

A serious logical fallacy that violates this rule is circulus vitiosus, i.e. *a vicious circle*. The meaning of this error is that the thesis is derived from the arguments, and the arguments in turn are derived from the thesis. It turns out to be a truly vicious circle. An example of such a vicious circle can be taken from Moliere's play "The Imaginary Invalid". In this play, one doctor explains why opium puts one to sleep: "opium puts one to sleep because it has a soporific power." Naturally, the question immediately arises as to why opium has a soporific power. The answer is: because it puts one to sleep. And it puts one to sleep because it has a soporific power, and so on ad infinitum, the thesis is derived from the arguments, the arguments from the thesis.

Such a violation of the rules of logical proof is similar in nature to those violations of the rules of definition which are called tautology (idem per idem—the same through the same) and a circle in the definition (see Chapter V, § 6). These errors in definition consist in the fact that some concept is defined through itself, a vicious circle (circulus vitiosus) is that any position or assertion *is proven* through itself.

An interesting example of a vicious circle in evidence is provided by an episode at the Danube Conference of 1948. The delegations of the USA, England and France claimed that the old convention on navigation on the Danube of 1921, which granted the major capitalist powers significant privileges in the area of navigation on the Danube, remained in force, as a result of which the privileges of these powers, called their "acquired rights", also remained in force. The head of the USSR delegation, A. Ya. Vyshinsky, disputing this assertion, cited the following arguments among other things:

"In proof that the Convention of 1921 has not lost its force and cannot lose its force without the consent of all the parties to this convention, reference was made to this convention itself and, in particular, to its Articles 5 and 42. As is known, these articles, on the one hand, state that nothing changes in the rights, powers, etc., arising from treaties, conventions, etc., relating to the Danube (Article 5), and that the convention can be revised in the manner established by the convention, that is, only with the consent of two-thirds of the states signatory to the convention (Article 42). Thus, proof that the Convention of 1921 still retains its force is drawn from this convention itself. This results in a rather curious situation: as proof that the 19-1 Convention exists, that it has not lost its force, and that those "acquired rights" that are indicated in this convention have also not lost their force, nothing other than this convention itself, as well as individual articles of this same convention, are cited.

In logic, this method of proof is called proof by the idem principle, per idem, which essentially means repeating the same thing or the same thing. Of course, this is not a way of proving. It is impossible to prove anything in this way, because it is a vicious circle, from which it is impossible to find a way out in this way.

We are told: the 1921 Convention remains in force because this Convention has not undergone the changes provided for in Article 42. But if the validity of the Convention itself is called into question, then the validity of each of its Articles, including Article 42, is also called into question. Consequently, it is impossible to prove that the 1921 Convention has not lost its force by referring to individual provisions of this same Convention. We are told that the States that signed the 1921 Convention have not lost the rights that were granted to them by this Convention. As evidence, they refer to Article 5 of the 1921 Convention. This means that the Convention itself, and in this case Article 340 5, are accepted as evidence in favour of the 1921 Convention. This is the same vicious circle from which there is no escape in a similar way"[1].

Rule six. The thesis must be a conclusion that follows logically from the arguments according to the general rules of inference. Since every proof has the form of an inference (deductive or inductive), in which only the order of the constituent parts is changed (the reasoning goes not from the premises to the conclusion, but from the conclusion to the premises), the proof must be carried out in compliance with all the rules of logical inference, which were discussed in the previous chapters of this book. Violation of any rule of inference entails the incorrectness of the proof. For example, all paralogisms and sophisms are at the same time false deductive proofs; an error in inductive inference, for example post hoc, ergo propter hoc (after this, therefore as a result of this, see Chapter XI, § 6), is at the same time an erroneous inductive proof.

[1] Izvestia, August 10, 1948.

§ 6. PROOF OF A PRIVATE FACT BASED ON OTHER PRIVATE FACTS

In deductive proof, as arguments we have a general rule and a particular case, from which, as from the premises of a syllogism, the truth of the thesis is deduced, representing the result of bringing a particular case under a general rule. In inductive proof, the arguments are a series of particular cases, from which the truth of the thesis is deduced, representing some general rule, general position.

A special type of inductive proof is the proof of a particular fact based on other particular facts. The peculiarity of this inductive proof is that the thesis is a particular fact expressed by an individual judgment, and not a general rule. One always encounters such proof when it is necessary to establish the existence of some particular fact. In a number of cases, a particular fact can be established by direct observation, by perceiving it; then the judgment about this fact does not require proof, since its truth is obvious. We see some object, some event occurs before our eyes. Our senses testify to the fact that this object exists, that this event actually occurred. But in all those cases when the truth of a judgment about a particular fact is not established by direct perception and is not obvious, the particular fact can be established by proof. There are two ways of proving a particular fact.

1. A particular fact is proven by the testimony of other persons. We ourselves could not observe the fact, the existence of which we want to verify, but it could be observed by other persons, with the help of whose testimony we establish this fact. If the verification of

the testimony of these persons leads to the conclusion that the testimony is correct, the established fact can be considered proven.

2. A particular fact is proved by other particular facts. Neither we ourselves nor any other persons could have observed the given fact, at least we could not obtain their testimony. In order to be convinced whether the given fact existed, we have to establish other facts which either we ourselves or other persons could have observed and concerning which there is reason to suppose that they are causally connected with the fact which we have to establish. This sought-after fact could have left some traces, thus being their cause, and could also have had as its cause some other fact. We shall look for various facts causally connected with the sought-after fact, and if we establish them with certainty and establish with the same certainty that they are causally connected with the fact which has to be proved, the problem will be solved. By observation or testimony we shall establish facts which were the effect of the unknown fact, or which were the cause of this fact, and thus by the effect we shall establish the cause or by the cause the effect.

So, if I see a deformed piece of metal and want to establish what caused its deformation, then by the nature of the piece, by the marks on it and by a number of other circumstances I can determine that the piece of metal was deformed, for example, by heating or hammer blows, etc. The thesis here will be the assertion that the piece of metal was deformed by hammer blows, the arguments will be judgments containing a description of the signs and marks of the object being examined.

Another example. It is necessary to establish the attribution of a literary work that appeared in print, for example, in the 18th century without indicating the author, to the pen of a given writer. We will solve this problem in various ways: we will compare this work with other works by different authors by theme, style, manner of writing, characteristic turns of phrase and images, then we will look for mentions of this work in other works by different writers of that time, etc. If we come to a certain conclusion, then the thesis will be the assertion that the work belongs to the pen of such and such an author, and the arguments will be indications of all the characteristic features of this work and various historical facts causally related to this work and the personality of the author. At some stages of the study, this assertion may be a hypothesis, which, according to the general rules for constructing and testing hypotheses, can turn into a reliable conclusion.

§ 7. DEFENCE AND REFUTATION

By its nature, proof has a positive meaning, i.e. the meaning of proof is that it proves the truth of some statement. A certain thesis is proved, i.e. its truth is proved, arguments are given that confirm this thesis. This is the meaning of any proof.

When someone proves the truth of a thesis, he provides arguments to support this thesis. But the thesis put forward can be disputed; then this thesis must be defended.

If the thesis is disputed or is expected to be disputed, the proof of the truth of the thesis is called a *defence*. Hence such expressions as defence of a dissertation for an academic degree or defence of a diploma project.

Any speaker or other person participating in a dispute who presents his point of view, proves its correctness, challenges the opponent's arguments or, in anticipation of possible objections, strives to comprehensively substantiate his statements, thereby *defends* his statements, defends *his* thesis.

But if one person provides evidence of the truth of a given thesis, then another person can challenge it, prove its incorrectness. *Proving the falsity of any thesis is called a refutation*. Every dispute, every polemic, every argument to one degree or another consists of some participants asserting certain positions, while others dispute these positions.

The participant in the discussion who challenges the thesis, does not agree with it, objects to it, thereby *refutes* this thesis, carries out its *refutation*.

If the discussion of any issue takes on a complex character, the participants in the discussion usually cannot hold only to their initial positions of defence and refutation—one defends the thesis, the other refutes it, since each of them has to both *defend* and *refute* . The one who put forward the thesis and defends it, has to refute at the same time the assertions that disagree with his thesis, i.e., in addition to defending his thesis, also refute another thesis. The one who objects to the thesis, refutes it, has to prove his own thesis at the same time, defend it, i.e., in addition to refuting, also defend it. Thus, during the discussion, defence and refutation can pass from one person to another or be carried out simultaneously by both.

§ 8. METHODS OF REFUTATION

Methods of refutation are in many ways identical to methods of defence. When proving a thesis, we present certain arguments that speak in favour of this thesis. When refuting this thesis, we do the same, present arguments that refute this thesis. At the same time, there are some differences between methods of defence and methods of refutation. The truth of a thesis can be proven in the following ways: by presenting arguments whose truth is beyond doubt and from which the truth of the thesis logically follows. This is direct proof; The truth of a thesis can also be proven in another way: by presenting arguments that prove the falsity of a statement that contradicts the thesis (antithesis), and thus come to the conclusion about the truth of the thesis. This is indirect proof. A refutation is conducted differently. A refutation can be directly directed against the arguments presented in support of the thesis, or against the connection of the arguments with the thesis, or against the thesis itself. Accordingly, the following methods of refutation are used.

The first method of refutation consists of criticizing the arguments put forward in favour of the thesis, i.e., proving that these arguments are false.

If we manage to refute the arguments given in support of the thesis, to prove their falsity, we will thereby refute the thesis. In this case, it is necessary to keep in mind the following. The arguments are the basis for the thesis, the thesis is the consequence following from the arguments. But, as we know, the falsity of the basis does not imply the falsity of the consequence, the consequence can be both false and true if it follows from some other reasons. Therefore, if it is proven that the arguments are false, this does not mean that the thesis is necessarily false, it can also be true, so that if someone has proven that the arguments put forward in support of the thesis are false, he has not yet proven that the thesis is false; perhaps the thesis is still true, but only unsuccessful arguments were given in its defence. Thus, with this method of refutation, the goal of the refutation — to prove the falsity of the thesis — is not fully achieved. However, the principle that was formulated for legal proofs by ancient Roman lawyers is quite applicable to logical proof: "the burden of proof lies with the one who asserts, and not with the one who denies" (ei incumbit probation qui dicit, non qui negat). Indeed, if someone has put forward a thesis, he must prove it, but if the arguments he has presented are false and the thesis is not proven, it will have to be rejected at least until true arguments are presented to confirm it.

The second method of refutation consists of proving that the truth of the thesis does not follow from the arguments presented in support of the thesis. A thesis is put forward, arguments are presented in support of it. The one who refutes the thesis does not argue against the arguments, admits that they are true, but proves that the thesis does not follow from them according to the rules of logical inference, "it does not follow" (non sequitur); some other thesis follows from these arguments, and not the one that is defended, or nothing follows at all. The considerations given regarding the first method are applicable to this method of refutation—the falsity of the thesis has not been positively established, it has only been established that the thesis has not been proven.

Proving the falsity of arguments can also be done in a more complex way: the arguments put forward in support of the thesis are conditionally accepted, but are developed by adding other indisputable arguments to them, and from them consequences are derived that contradict the evidence and generally accepted truths. Since the consequences that follow from the arguments turn out to be false, the arguments are also false (according to the rule: if the consequence is false, the basis is also false). This method of establishing the falsity of arguments is called reductio ad absurdum (reduction to absurdity—see § 4).

The third method of refutation consists of independently proving a new thesis, which is an opposite or contradictory judgment in relation to the refuted thesis. This method of refutation is very important. A thesis is put forward and arguments are given in favour of this thesis. The one who does not agree with the thesis puts aside this thesis and arguments and independently proves another thesis, which is an opposite or contradictory judgment in relation to the disputed thesis; if this is done successfully, then the thesis will be refuted, which, by virtue of the law of contradiction, cannot be true, since another, opposite and contradictory thesis is true.

This method differs from the first two. The first two methods consist of disputing a thesis defended by someone, but the disputing person himself does not assert anything. There is another common feature in the first two methods of refutation: the one who disproves in the course of reasoning follows in the footsteps of the one he disproves, follows him, follows his arguments. The third method is different: the refutation is given completely independently of the arguments of the defence. The one who disproves independently proves a thesis that is incompatible with the thesis being refuted.

Which of these methods is more convenient and more often used, which is better to deal with in our practice? It must be said that all methods are generally acceptable, and very often in any dispute we see a combination of all three methods. Often, a one-sided application of only one method is incorrect and gives a negative result. For example, there is a scientific discussion. The speaker defends some thesis. Sometimes opponents speak up and begin to destroy the speaker's argumentation, but say nothing about how to correctly resolve the issue. What the speaker asserts is incorrect, and when asked what is true, the opponent answers that "we need to think about it." Such a discussion is doomed to failure. There is another situation: the speaker puts forward a thesis, defends it, claims that this problem is solved in such and such a way; then the opponents speak up and, without touching on the speaker's argumentation at all, as if the report had not happened, begin to independently develop and defend their own thesis. This is also incorrect, because it will be difficult to figure out who is right and who is wrong. It is obviously necessary to combine all these methods together: when challenging an incorrect thesis, on the one hand, criticize and destroy the opponent's argumentation, and on the other hand, put forward your thesis, giving your positive solution to the issue under discussion.

§ 9. PROOF OF NEGATIVE PROVISIONS

The question of methods of refutation is connected with the question of proving negative propositions, or, as is commonly said, proving negative facts. Until now, when we spoke of proving a thesis, of defending it, by a thesis we meant an assertion of some fact, namely, a positive fact, i.e. an assertion that something happened, something happened somewhere, that such and such an object has such and such properties, etc. A thesis contains a positive fact, and a refutation has the character of a denial of this thesis, a denial of the existence of this fact; therefore, a thesis is an assertion, and a refutation is a denial. But there may be cases when the thesis in a proof is a negative judgment, i.e. the essence of the thesis consists in indicating that such and such an object did not exist, such and such an event did not occur, such and such an action was not performed, such and such an object does not have such and such properties, etc.

The concept of a negative fact is conditional. In logical terms, it means the denial of a fact, i.e. a negative judgment that denies the existence of a fact (this event did not happen, this action was not performed, this person was not present there, etc.). But we can also speak conditionally of a negative fact: an event happened—that is a fact, but if it did not actually happen—that is also a fact; a given person performed such and such an action—that is a fact, but if he did not actually perform this action—that is also a fact.

When the content of the thesis is a negative fact, the process of proof is specific. A negative fact has to be proven differently than a positive one.

For example, it is proved that this person was not in this place at this moment, such and such person did not say such and such words, etc. This means that the thesis in these cases is a negative judgment and the proof consists in the fact that it is required to prove a negative fact. Is it possible to prove a negative fact and how?

A negative fact can sometimes be proven without much difficulty in cases where the given circumstance relates to a certain limited time and place. For example, it must be proven that a given person was not in a certain place at a certain time; some people saw everyone who was in that place at that time, and the given person was not among those present. In this case, 348 a negative fact, i.e., the absence of a person in a given place, can be proven by the testimony of other people.

But such a method of proving a negative fact is not always possible, in a number of cases it is not possible to testify that such an event did not take place, such and such a fact did not exist. Then another, more complex method of proving a negative fact is used: *some other positive fact is proven, incompatible with the fact that contradicts the negative fact being proven, from which, according to the law of the excluded middle, the truth of this negative fact follows.*

We need to prove the negative fact that event A did not happen, that it did not occur. In other words, we need to prove the negative judgment: *A* is not *B*. In order to prove the truth of the negative judgment *A* is not *B*, it is enough to prove the falsity of the judgment *A* is *B*, and this can be done by proving the truth of the judgment *A* is C, which is incompatible *with* the judgment *A* is *B*. If we prove that *A* is *C*, then it is false that *A* is *B*; and if it is false that A is B, then it is true that *A* is not *B*, which is what had to be proved.

Such proof of a negative fact is often encountered in court cases in relation to the so-called alibi . Alibi literally means “in another place” and is as follows. If it is proven in relation to a person accused of committing a crime that at the time of the crime he was not in the place where the crime was committed, it will thereby be proven that the accused did not commit this crime (murder, theft, etc.). It is possible to prove that the accused was not in the place where the crime was committed at a given time by proving his presence at that time in another place. If it is proven that the accused was in another place at that time, then it is incorrect that he was at the place where the crime was committed at that time; if it is incorrect that the accused was at the place where the crime was committed at that time, then it is correct that he was not there; if it is correct that at the time of the crime the accused was not in that place, then he did not commit that crime. It should be borne in mind that proof of alibi eliminates the guilt of the accused only in cases where the person is accused of having physically committed the criminal acts. If the person is accused of organizing the crime, of inciting the crime, alibi may have no significance, since the organiser or instigator may carry out their criminal activity without being present at the place where the crime was committed.

§ 10 PROOFS "TO THE TRUTH", "TO THE MAN" AND "TO THE PUBLIC"

The purpose of any proof is to establish the truth. Those proofs that are designed to achieve this goal by providing weighty, well-founded arguments from which the truth of the thesis being proven follows are called proofs ad veritatem, i.e. to the truth, for the truth. Such are all truly scientific proofs, and it is precisely about them that we have been talking all the time above. A truly scientific proof is a proof "to the truth" (ad veritatem).

Along with these, there are other proofs called ad proofs. hominem , i.e. evidence "to a person". Such evidence is that which does not consist in proving some position on the merits, but in characterizing the personality of the person whose assertion is being disputed. Often evidence ad hominem are used when refuting a thesis or when challenging an objection to a thesis. Such evidence includes, for example, the following. When refuting someone's theoretical position, I do not analyse it on its merits, but only prove that the author is not a serious person, not a real scientist, and that he cannot create anything solid. Or, when disputing someone's assertion about a particular event, I do not refute this assertion on its merits, but say that this person simply cannot be trusted.

Finally, there are also the so-called ad evidences. populum—"to the public" (literally—"to the people"). Proof ad populum consists in acting on the feelings of people, and not on their reason, in influencing them, in arousing in them sympathy for one thing, antipathy for another, and thus making them believe in the correctness of the thesis put forward or in the falsity of its refutation without proving the thesis itself in essence.

Evidence “to the person” and “to the public” are inadmissible as independent methods of proof and are logical errors. This does not mean that when investigating a particular issue, discussing and verifying a particular statement, the possibility of verifying the circumstances relating to the personality of the person making the statement^ regarding a particular fact is excluded. For example, in judicial activity, when assessing the testimony of a witness from the point of view of its reliability or unreliability, it is necessary to clarify and take into account the personality of the witness, his interest or disinterest in the case, etc.

In the same way, when proving a position, it is entirely acceptable, and often necessary, to appeal to the feelings of those whom the speaker is trying to convince of the truth of his thesis. For example, a speaker on a topic, an orator on a particular issue, does not limit themselves to proving the truth of a position, they try to evoke certain emotions in the listeners, feelings of sympathy for what is being proven, and, conversely, feelings of antipathy for what is being refuted. A political speaker influences not only the minds of those to whom he is addressing, but also their feelings. A court speaker, a prosecutor supporting the charge in court, strives to evoke in the court audience indignation at the crime, indignation towards the criminal. The educational value of public speeches on political, scientific and other issues consists not only in the fact that they communicate certain information to the listeners, but also in the fact that certain emotions are evoked, certain feelings are developed and strengthened. But all such methods are quite correct and admissible only on the basis of "proof to the truth", i.e. when the thesis is proven or refuted in essence. These methods cannot replace proof, otherwise the truth will not be discovered or its discovery will be complicated and difficult, and the issue under discussion will be confused and obscured by the fact that circumstances irrelevant to the case and distracting attention to extraneous facts will be brought into the discussion. Otherwise, there are cases when the disputing parties, not having real arguments to defend their thesis and refute the thesis of the opposing party, resort to proof "to the man" and "to the public", hoping in this way to discredit their opponent and win the sympathies of the audience present. Such methods cannot have as their result anything other than confusing the issue under discussion and pushing towards erroneous decisions.

§ 11. THE SIGNIFICANCE OF PROOF IN LOGIC

Some bourgeois scholars claim that all logic is nothing more than the doctrine of proof: proofs are not part of logic, but all logic. This point of view is held by those who interpret logic as the "logic of verification", according to which logical laws serve only the purpose of verifying already formulated propositions, ready-made solutions, and not the purpose of research, the search for truth. Supporters of the "logic of verification" (many bourgeois logicians belong to them) believe that the laws of logic do not determine the process of thinking itself, do not indicate how to seek the truth, come to true propositions. The laws of logic show their power only after the conclusion has already been made, the proposition has been formulated, and it remains to verify the truth of the conclusion made, the formulated proposition, to prove its truth. With this understanding of logic, it really turns out to be only the logic of verifying ready-made conclusions, i.e. the logic of proof. This understanding of logic is incorrect. It is based on the idealistic view that logic provides a criterion for the truth of judgments and inferences: that which corresponds to the laws of logic is true, that which contradicts them is false, therefore logic acts as a judge in determining the truth of those conclusions that are made during the study of various areas of reality. It is absolutely certain that such an understanding of the tasks of logic is incorrect, idealistic, unscientific, it leads people away from the knowledge of objective reality, and gives logical laws a self-sufficient character. The criterion for the truth of our judgments and inferences is in their correspondence to objective reality, and this is established by experience, practice, and the study of the phenomena of reality themselves, and not only by means of formal logical operations. That which corresponds to objective reality is true, that which contradicts it is false. Bourgeois logicians separate judgments from objective reality, see the truth of judgments only in their consistency, agreement with each other, and therefore reduce all logic to proof, to the formal logical justification of already accepted, ready-made propositions. The Marxist understanding of the tasks of logic is different, fundamentally different from this unscientific idealistic concept. The goal of logic, its main task, is to promote, to assist in the correct cognition of objective reality.

Logic gives us the means to help discover the truth, to derive new, previously unknown propositions, to establish new, previously unknown facts (rules of judgment and inference). Logical means alone are not enough to discover the truth, but they are necessary (see Chapter III). When we have come to a conclusion, established a certain proposition, logic gives us the means to verify the correctness of this proposition. Logical verification of conclusions alone is also not enough, the correctness of our conclusions is verified by experience, practice, but logical justification of our statements, their proof are also necessary. Thus, logic is used not only to verify the results of an already completed thought process, but also to ensure that the thought process itself proceeds correctly. In other words, we need logic both when we *are looking for* the truth and when we are checking the truth of conclusions, *proving* that what we have found is truly the truth.

This leads to the solution of the question of the place of proofs in logic. In logic, proof is the defence of a true thesis and the refutation of a false one. Consequently, logical proof is applied only after the thesis has been put forward, formulated, and all that remains is to substantiate its truth, to convince oneself and others of its truth or falsity. Obviously, proofs do not exhaust all of logic, do not cover all of its content, but constitute only a part of logic.

But it is also obvious that the part of logic that is devoted to proofs is not only a very important part of logic, but also the final part: we have sought the truth, we think that we have found it, but we will be convinced that this is the truth, and we will convince others of this only when we prove that the conclusion we have arrived at is really the truth, and not a lie, not a delusion. But, having noted this important significance of formal-logical proof, it is necessary to point out its limited role in scientific research, corresponding to the limited role of formal logic itself, which was discussed in detail in Chapter III of this book.

When studying objects, phenomena of reality in their movement, development, internal contradictions that are discovered in them, i.e. when studying the phenomena of nature and society by applying the dialectical method, formal logical proof turns out to be insufficient. Engels wrote: “Simple proof here decisively recedes into the background in comparison with the diverse application of this method to new areas of research” [1].

Just as a formal-logical definition is only a brief, summarizing formula, and a true definition is, in the words of Engels, “the development of the very essence of the matter” (see Chapter V , § 6), a formal-logical proof is also only a final justification of the results achieved by our research, an argument in favour of the truth (or falsity) of this or that scientific proposition. But the truth obtained by dialectical means can be fully proven only by the entire course of scientific research, by all the diverse applications of the dialectical method to new areas of research, and this goes beyond the limits of formal logic and belongs to the area of dialectical logic.

[1] *F. Engels*, Anti-Dühring, p. 127.

CONCLUSION

This concludes our consideration of issues of formal logic and we can draw some general conclusions.

The laws of logic, both fundamental (the laws of identity, contradiction, excluded middle and sufficient reason) and those related to individual forms of thinking (syllogism, inductive inference, proof, etc.), are necessary properties of thought, and only when they are observed is thinking correct. These laws express the simplest properties and relationships of objects and phenomena of objective reality that exist outside and independently of our consciousness, thinking and are reflected in it, and this is what determines the objective and necessary nature of logical laws. Thus, the laws of logic must be considered *materialistically*.

The laws of logic are not invented, not created, they represent a necessary property of thought, conditioned by the fact that objective reality is reflected in thinking. Our judgments and conclusions are true if the thoughts and connections of thoughts expressed in them correctly reflect real phenomena and connections of phenomena of objective reality. The laws of logic are an expression of certain aspects, properties of reality. These laws are revealed and fixed in thinking as a result of centuries of practice, the experience of mankind. Lenin wrote: "... the practice of man, repeating itself billions of times, is fixed in the consciousness of man by the figures of logic" [1] . Logic serves the purpose of knowing objective reality. Comrade Stalin points out that "Marxist philosophical materialism proceeds from the fact that the world and its laws are entirely knowable, that our knowledge of the laws of nature, verified by experience and practice, is reliable knowledge that has the significance of objective truths, that there are no unknowable things in the world, but only things that have not yet been known, which will be revealed and known by the forces of science and practice”[2]. And further:

“If the world is knowable and our knowledge of the laws of development of nature is reliable knowledge, having the meaning of objective truth, then it follows from this that social life, the development of society, is also knowable, and the data of science on the laws of development of society are reliable data, having the meaning of objective truths”[3].

Logical thinking, i.e. thinking in accordance with the laws of logic, is extremely important both in the field of science and in the field of practice. People think logically; people learn the laws of logic and use them in their everyday practice, in constant communication with other people. Logical thinking is inherent in all people, the nation, and the science of logic is called upon to discover and develop the laws of thinking so that following them is *conscious* . It is precisely conscious following of the laws of logic in everyday and scientific thinking that disciplines thinking, makes it more consistent, harmonious, *logical* and helps to avoid errors in thinking.

The study and development of laws and rules of thinking is the task *of the science* of formal logic.

The laws of logic are the laws of thought, which express objective reality. The laws of logic have their

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[2] *J. V. Stalin*, Questions of Leninism, 11th ed., p. 543.
[1] *V. I. Lenin*, Philosophical Notebooks, p. 188.
[3] Ibid., p. 544.

basis in this reality, in the properties and relationships of the phenomena of reality, and this is precisely why logic serves as a tool, a means of knowing reality. Otherwise, i.e., if we consider the laws of formal logic not materialistically, but idealistically, if we understand thought as something spontaneous, and not a reflection of objective *reality in consciousness* , formal logic inevitably turns into formalistic logic, divorced from the content of thinking and indifferent to it, representing an empty play with concepts, devoid of practical cognitive significance. It is precisely into such formalistic logic that formal logic has turned in bourgeois philosophy, which corresponds to its goal — to darken the consciousness of workers, their subordination to bourgeois ideology. Formal logic, like any science, is partisan; behind the various theories and interpretations of logic and its laws are ultimately hidden class interests, their struggle. Bourgeois theories of formal logic are an expression of bourgeois ideology, bourgeois class worldview and, like all bourgeois science, serve the task of perpetuating bourgeois social orders. In this book we could touch on individual bourgeois logical theories only in passing and briefly. Their examination and exposure should be the subject of a special work.

The Marxist, materialistic study of formal logic serves the tasks of advanced Marxist science, Soviet science, and socialist ideology. Correctly understood formal logic is important for Soviet people, since it improves the work of thought, facilitates the study and resolution of theoretical and practical issues. Marxist-Leninist philosophy, unlike bourgeois philosophy, does not consider formal logic to be the only or main science of the laws of correct thinking, exhausting the entire process of cognition of reality. The laws of formal logic express only the simplest properties and relationships of objects and phenomena of reality, considered in a state of relative stability, immobility, and not in development, movement. Therefore, formal logic is only the lowest, preparatory stage of cognition in relation to dialectical logic, the methodology of dialectical materialism. Cognition of reality is achieved with the help of the Marxist dialectical method. Dialectical thinking, breaking through the narrow horizons of formal logic, takes us beyond its limits. However, it does not eliminate formal logic, but preserves its laws in full force as the simplest, elementary condition of thinking, which does not exhaust the tasks of cognition, but is necessary for it. This is precisely why the study of formal logic is necessary for a Marxist: it serves as an aid in the dialectical study of natural and social phenomena and helps Soviet people in their victorious struggle to build a communist society.

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