

Philosophy in the USSR

**Problems
of Dialectical
Materialism**



**PROGRESS PUBLISHERS
MOSCOW**

Translated from the Russian by *Robert Daglish*

Designed by *Vadim Kuleshov*

ФИЛОСОФИЯ В СССР

Проблемы диалектического материализма

На английском языке



First printing 1977

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Printed in the Union of Soviet Socialist Republics

Ф $\frac{10502-491}{014(01)-77}$ 68-77

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809.8
F4825313

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FOREWORD

Written by a team of prominent Soviet philosophers, this book reflects the contribution made by Soviet thought to the solution of both traditional philosophical problems and those that face philosophy today. Not only will the reader obtain much accurate and objective information about the philosophical concepts evolved by Marx, Engels and Lenin and their contemporary creative development; he will also be able to see for himself how wrong are the assertions that a gap exists between their ideas based on dialectical materialism and the problems of contemporary philosophy.

It would be hard to overestimate the relevance of the ideas of Marxist-Leninist philosophy to the solution of the problems arising at the present stage in world development. The enormous advances in man's knowledge of the material world confirm the fact that these ideas are scientifically founded. Hence the growing interest that Western scientists and technologists have acquired in materialist dialectics, an interest which the present volume seeks in some measure to satisfy.

The book is divided into three parts. The first, "General Methodological Problems", contains two articles, one by Member of the USSR Academy of Sciences P. N. Fedoseyev and the other by T. I. Oizerman, a corresponding member of the USSR Academy of Sciences.

Fedoseyev's article gives a general picture of philosophical research in the USSR today and outlines its further development. Oizerman provides a historico-philosophical introduction to the problems of dialectical materialism.

The second part, "Dialectics of Being and Consciousness", comprises five chapters written by Doctors of Philosophical Sciences S. T. Melukhin, E. V. Ilyenkov, V. A. Lektorsky, A. P. Sheptulin and A. S. Bogomolov. Melukhin discusses the substantial concept of

matter in its historico-philosophical aspect. Sheptulin analyses the problems of the categories of materialist dialectics and their interconnections. Questions related to the dialectics of the subject and object in scientific cognition are considered by Lektorsky. The current problems of dialectical logic are discussed in the chapter by Bogomolov, who shows that dialectical logic is an effective means of scientific and philosophical cognition. The problem of social consciousness is considered by Doctor of Philosophical Sciences E. V. Ilyenkov. On the basis of a careful analysis of works by Marx and Engels he elucidates the concept of the ideal from the standpoint of dialectical materialism.

The third and final part, "Problems of the Theory of Knowledge", also consists of five chapters. Member of the USSR Academy of Pedagogical Sciences A. N. Leontyev uses the results of present-day research on the borderline problems of philosophy and psychology to discuss the active nature of human consciousness, and analyses the relationship between social consciousness and the specific features of the individual mentality. Doctor of Philosophical Sciences G. A. Kursanov's article is devoted to an examination of the problem of truth as conceived in Marxist philosophy. Doctor of Philosophical Sciences D. P. Gorsky in his analysis of the part played by social practice in forming scientific concepts singles out two factors that determine the development of scientific knowledge: (1) the needs of social practice and (2) the internal logic of science itself. In his article, Doctor of Philosophical Sciences Z. M. Orudzhev touches upon some problems of dialectical logic. The concluding chapter is written by Doctor of Philosophical Sciences V. Z. Kelle, who examines ideology as a phenomenon of social consciousness.

Part One

GENERAL METHODOLOGICAL PROBLEMS

P. N. FEDOSEYEV

SCIENTIFIC COGNITION TODAY, ITS SPECIFIC FEATURES AND PROBLEMS

The contemporary development of the fundamental lines of research in the natural and social sciences forms the theoretical basis of the scientific and technological revolution and the social changes that go with it. This revolution which has emerged as one of the most important processes of the present age, offers mankind unprecedented opportunities for social progress, but has also given rise to some very difficult and far-ranging problems. Hence the growing interest in the philosophical aspects of the natural and technical sciences.

The broad interpretation of the structure of modern science, of the specific ways in which its main trends interact, the analysis of its general laws, of the sources, conditions and prospects of its development, form a crucial, many-sided problem, to the solution of which Soviet philosophy—dialectical and historical materialism—is making a direct contribution. A thorough understanding of these questions is today becoming an essential prerequisite for the successful organisation of scientific work itself, for the correct selection and concentration of forces on the main sectors of basic and applied research. Thus the elaboration of the philosophical problems of contemporary natural science from the standpoint of dialectical materialism is also acquiring an ever greater practical importance.

As is shown by analysis of the present state of the natural sciences, the main task in this field is to work out the general methodological problems of the natural sciences on the basis of development of materialist dialectics as the logic and theory of knowledge, in other words, to apply Marxist-Leninist ideas to the solution of the philosophical problems of the natural sciences.

In dealing with these questions Soviet philosophers and natural scientists base themselves on the idea of the need for an alliance between natural scientists and Marxist philosophers that Lenin

proposed in his work "On the Significance of Militant Materialism" In this work, charting the basic lines of development of Marxist philosophy and setting the tasks to be accomplished in the process of forming a socialist ideology, Lenin speaks of the need for philosophical interpretation of the latest achievements of natural science, as an essential condition for the defence and development of the dialectical-materialist world-outlook. This is a tremendous task whose accomplishment demands the joint efforts of natural scientists and philosophers.

"...It must be realised that no natural science and no materialism can hold its own in the struggle against the onslaught of bourgeois ideas and the restoration of the bourgeois world-outlook unless it stands on solid philosophical ground. In order to hold his own in this struggle and carry it to a victorious finish, the natural scientist must be a modern materialist, a conscious adherent of the materialism represented by Marx, i. e., he must be a dialectical materialist."*

In the half century that has passed since then the specific forms of this alliance have changed depending on the degree of development of the natural sciences and the extent to which their philosophical problems have been elaborated. But Lenin's principle of concord between Marxist philosophers and natural scientists has stood the test of time and proved its viability.

This is because Lenin's principle derives logically from the materialist, the scientific approach to nature as a target of philosophical inquiry, from the Marxist understanding of science and its social role. From the outset Marxist philosophy made a clean break with the precepts of natural philosophy, which inevitably impose a priori conceptions on the natural sciences and lead to the substitution of a purely speculative approach for specific analysis of specific problems, the substitution of imaginary connections for those that actually exist. "Modern materialism is essentially dialectic, and no longer needs any philosophy standing above the other sciences."** The founders of scientific philosophy held that the task of philosophy was to study the most general laws of nature, society and thought, and to evolve an integrated, scientifically substantiated view of the world.

This notion of the subject-matter of scientific philosophy and its relationship with natural science was developed by Lenin. He showed that in the context of vigorous scientific advance, of the break-up of old notions, principles and theories and the emergence of essentially new ones, in the context of intensive mathematisation of the natural sciences, the significance of the interconnection between philosophy and the natural sciences, far from weakening, is enormously

* V. I. Lenin, *Collected Works*, Vol. 33, p. 233.

** Frederick Engels, *Anti-Dühring*, Moscow, 1975, pp. 33-34.

enhanced. From his materialist interpretation of Hegel's well-known proposition on the identity of dialectics, logic and the theory of knowledge, Lenin drew the conclusion that the philosophical interpretation of the achievements of the natural sciences, of the whole history of human cognition, technology and material and spiritual culture, of all the processes of social life, is the main source of development of materialist dialectics. Dialectics, in its turn, by revealing on this basis the most general laws of objective reality arms the specialised sciences with a general philosophical method of cognition and transformation of reality.

Lenin showed that the interaction of philosophy and natural science is an objective requirement for the development of both these fields of knowledge, which can be fully satisfied only in the form of an alliance between Marxist philosophers and natural scientists. Dialectical materialism does not claim to be able to solve the specific problems studied by the sciences of nature, but it does develop in close contact with them. Natural science does not undertake the specialised philosophical investigation of such questions as the interrelationship between subject and object, theory and practice, and yet without a principled theoretical answer to such questions it is impossible to find the right approach to any methodological problem of this or that science or theory, to synthesise the achievements of the various sciences and build a new scientific picture of the world. The essence of Lenin's idea is a creative alliance between the exponents of dialectical materialism and natural scientists in solving the philosophical and methodological problems of the natural sciences and thus advancing both science and philosophy.

All the major achievements of Soviet philosophers in this field—the affirmation of the dialectical-materialist world-outlook among scientists and technologists, their creative and practical cooperation with philosophers, the successes in generalising the latest findings of the natural sciences and the enrichment of materialist dialectics on this basis—rest on the consistent realisation of the principles of the alliance between natural scientists and philosophers evolved by Lenin. Whenever these principles were violated difficulties arose that inhibited the fruitful work of both philosophers and natural scientists. The prestige of Marxist-Leninist philosophy among natural scientists and their collaboration with philosophers have grown in the process of a hard struggle against hostile philosophical trends, of overcoming difficulties, shortcomings and mistakes, in the course of joint efforts to arrive at a philosophical interpretation of the latest discoveries of natural science.

We can say with confidence today that the alliance bequeathed to us by Lenin is functioning well. It is one of the main sources of development of Marxist-Leninist philosophy and an important condition of progress in the natural and technical sciences.

As we have already noted, the alliance between natural scientists and Marxist philosophers has assumed different forms at different stages. In the 1950s inquiry into the philosophical aspects of the natural sciences concentrated mainly on well-known and generally acknowledged scientific theories, particularly the theory of relativity and quantum mechanics. The dialectical-materialist foundations for the interpretation of other fundamental theories that shaped the face of science in the first half of this century were also elaborated, and certain categories of dialectics, particularly those of causality, necessity, chance, possibility, reality and law, were deepened and made more concrete on this basis. In this period also the difficulties that had accumulated in the preceding years were overcome and mutual understanding was re-established between philosophers and natural scientists.

The work performed in that period made it possible to approach a new frontier in the sixties. Philosophical inquiries in the sphere of the natural sciences became increasingly oriented on the problems connected with the future of science, with scientific trends that were only just emerging and finding their feet but promised to become paramount in the future.

Attention was focussed on the problems of such branches of science as the physics of elementary particles, extra-galactic astronomy, molecular biology, cybernetics, and operations research. Systems and structure research was extensively developed. The problems of the active nature of cognition were more deeply analysed. A new priority in philosophical studies was given to questions of the material unity of the world and the qualitative uniqueness of individual spheres of reality, to questions of the general and the particular, which was due to the penetration of biology by physics and chemistry, the wide application of cybernetics, and intensified interaction of the natural and social sciences.

This new approach with its wider range of subject-matter and increased emphasis on scientific relevance developed and strengthened the alliance between natural scientists and philosophers. Basic methodological problems have been worked out and such forms of collaboration have arisen as joint research by philosophers and scientists and the holding of scientific conferences and symposiums on the current philosophical problems of contemporary science.

Like all the major problems of modern science, these fundamental philosophical questions demand an integrated approach. They cannot be investigated without collaboration between the various branches of science. It should be mentioned that a major contribution to this work has been made by Soviet natural scientists such as S. I. Vavilov, A. F. Joffe, V. A. Fock, M. A. Markov, A. D. Alexandrov, N. N. Semyonov, N. P. Dubinin, V. A. Engelgardt, V. A. Ambarsumyan, A. I. Berg, S. L. Sobolev, and P. K. Anokhin.

The high scientific standard achieved in studies of the philosophical questions of modern natural science has made the struggle against bourgeois philosophy more effective and raised the prestige of materialist dialectics among scientists abroad. World scientific development indicates that the dialectical-materialist world-outlook provides the only reliable basis for a deep-going philosophical interpretation of its vigorous and rapid progress.

The specific feature of the present stage in the elaboration of the philosophical problems of natural science is to be found in the much more important part that science and technology now play in the building of the material and technical basis of communism, in the all-round development of socialist society. The task of organically combining the achievements of the scientific and technological revolution with the advantages of the socialist system, which was set by the 24th and elaborated at the 25th Congress of the CPSU, induces a fresh view of the traditional problems of the philosophy of natural science and technology and prompts us to single out aspects and facets that previously appeared insignificant or even passed unnoticed. It has become necessary to consider the problems of the natural and technical sciences in close relation to their growing social role and their increased influence on the course of social development.

The need for such an approach is dictated primarily by the deepening process of convergence of the natural and technical sciences and the social sciences. As Marx predicted, science is becoming a direct productive force, and production, the technological application of science. In the light of this process one is made particularly aware of the bankruptcy of those neopositivist conceptions that juxtapose the social and natural sciences and erect an insurmountable barrier between nature and social life.

The present stage in the convergence of the natural and social sciences requires further elaboration of theory and methodology that will make it possible, on the one hand, to bring about this synthesis and understand its essential nature and, on the other hand, provide the key to the solution of the qualitatively new, complex problems that arise on the borderline between the natural and social sciences. Such a philosophical and methodological function can be performed only by Marxist-Leninist philosophy, which is an integrated doctrine dealing with the most general laws of nature, society and thought. The task is to deepen and concretise the basic Marxist-Leninist propositions and categories in their application to the specific features of this process.

The interaction of the natural and social sciences may be investigated from three angles: the economic or production angle (study of changes in the structure and organisation of production evoked by scientific advances and the accompanying progress of technology); the social angle (investigation of the effects of the

revolution in science and the productive forces on the socio-economic, political, intellectual and ideological spheres of social life); and the epistemological angle (elaboration of the general principles and methods of approach to complex problems, analysis of changes in the investigative techniques of the natural and social sciences that have taken place as a result of their convergence).

By no means all the problems mentioned above come within the competence of the philosophy of natural science, of course. It is indisputable, however, that the deep-going convergence of the sciences of nature and society shows up the inadequacy of the purely ontological, epistemological and logico-methodological lines of inquiry into the philosophical problems of natural science. The "three-dimensional" picture they have produced of scientific cognition must be given a new, "fourth" dimension, which summarises the most general processes and phenomena generated by the deep penetration of social life by science and technology. This kind of extremely broad "four-dimensional" synthesis is an essential condition for the further development of the dialectical-materialist world-outlook as an integral system of knowledge expressing the material unity of the world in all the diversity of its specific manifestations.

Let us now take some of the current scientific problems whose solution involves interaction of the natural and social sciences.

Soviet society is at present faced with the enormously important task of controlling large systems in the spheres of the national economy, political relations, and science. What is man's place in the highly complex "man-nature-technology" system? This question is of exceptional philosophical and methodological importance and the scientific answer to it can be given only on the basis of the dialectical-materialist generalisation of the latest advances in the natural, technical and social sciences.

Another example. The scientific and technological revolution has enormously expanded man's ability to influence his natural environment. This influence has now assumed global proportions. Unfortunately, people often do not fully comprehend all the possible results of these incursions. But it is a fact that certain changes in the natural environment are irreversible and may permanently worsen people's natural conditions of life. But are such consequences inevitable? If we are to assess them properly, we must take into consideration various aspects of the man-nature relationship.

Suffice it to say that in the conditions of the contemporary scientific and technological revolution man has brought about changes in his environment that to a very great extent have a reciprocal effect on him. And this effect calls for investigation. Man is faced with new problems of adaptation to changing conditions. These problems are, of course, particularly urgent in the most developed countries.

It is now possible to discuss such problems not only on the general philosophical plane but also in specific scientific terms because the data of biology, and particularly genetics, open new avenues for studying the interaction of the social and the biological in the process of human development, the development of the individual.

In the West the problems of ecology have of late been treated sensationally. They are, of course, urgent and complex and demand serious attention. The sensationalism surrounding them, however, is often designed not so much to help solve the problems as to obscure the fundamental contradictions of bourgeois society, to divert attention from social problems.

At the present stage in the development of the social sciences there can be no return to any forms of social-Darwinism or vulgarised "biological" interpretations of man. Among Soviet scientists and philosophers it is axiomatic that man is a social being, that his development and behaviour are ultimately conditioned by social relations. But we are also opposed to oversimplified notions that man is nothing more than a bunch of economic or social factors. Man is a social being but he is also a part of nature, a biological being. As Engels said, he has corporeal existence. And this interconnection of the social and the biological is a very important and far-reaching problem that calls for all-round scientific investigation.

In recent years the problem of the so-called information explosion has become increasingly acute. The demands of scientific development, the tasks of optimising production and processing information make it imperative to solve the problem of information value. How can we find the right criteria?

This "problem of the century" confronts science as a whole and philosophy in particular, inasmuch as the latter has always sought to "compress" information by generalising concepts. In this connection a very urgent task is the further elaboration of the theory of dialectics itself, because the pressure of new scientific data calls for development of the conceptual apparatus, including concretisation and deepening of the categories of dialectics. Natural science has always been an important source of such development.

The list of examples could be extended. Mention should also be made of the important sector that has come into being on the borderline of the natural and social sciences, namely, the epistemological and logico-methodological problems of research on complex systems (automated control systems; complex systems used in space exploration; biotechnical appliances in medicine, and so on). But sufficient examples have been cited to illustrate the specific nature of the problems raised by the scientific and technological revolution and the convergence of the natural and social sciences, and to demonstrate their theoretical and practical significance.

At present two tendencies have been noted in investigation of the philosophical problems posed by natural science. On the one hand, there is the tendency to elaborate the methodological problems of the individual sciences. On the other hand, stress is laid on working out the theory of dialectics itself, evolving new philosophical categories.

These two approaches cannot be isolated from one another, of course. The needs of development of both natural science and materialist dialectics indicate that modern science should, above all, be interpreted as a form of cognition and (to a certain extent) transformation of reality.

Essentially this task is a matter of moulding materialist dialectics into an integrated and harmonious system of philosophical and methodological principles, an "organon", so to speak, of modern science, and presupposes the generalisation not only of processes and phenomena occurring in "pure" science, but also of the changes in the nature of the connections between science and practice, and in social practice itself under the influence of science. One must take into account how scientific thought is influenced by socio-economic and ideological factors, by the struggle between the two opposed social systems on the world scene. Clearly, the solution of this task as a whole demands a complex approach, the joint efforts of representatives of all branches of Marxist philosophy.

Philosophical analysis of the specific features of scientific thought has already yielded definite results, primarily in formulating the general logical and methodological problems of science.

Research in this field concentrates on such problems as generalisation of the processes of mathematisation and formalisation of science; changes in the structure of scientific theories (transition to ever more abstract models; increasingly complex relationships between theoretical constructs and experience); penetration of the concepts and methods of some sciences into others (physics into chemistry, physics and chemistry into biology, etc.). In recent years new methods of cognition that may be applied in many sciences have emerged (cybernetics, semiotic and systems approach) and these are also undergoing thorough philosophical investigation.

In the course of these researches it has become even more apparent that the changes in the cognitive apparatus of natural science can be philosophically interpreted only from the positions of the materialist theory of reflection, because only this theory makes it possible to explain the processes of origin and development, and the specific content of the various methods that coexist and supersede one another in history, to predict the trends in the development of scientific thought. The enrichment and concretisation of the philosophical principle of reflection on the basis of the above-mentioned researches enhance its philosophical significance and

make it a more effective instrument for the analysis of the logical and methodological problems of scientific cognition.

Studies in this field always note the enhanced role of theoretical thought. Indisputably the role of theory and, hence, of the logical apparatus, of semiotic means of cognition, has increased to an enormous extent. But the possibilities of observation have also expanded considerably and the fund of accumulated empirical data has increased. A kind of competition is going on between the flood of new empirical facts and the ability of theoretical thought to "digest" them, that is, to describe or include them in this or that specific theory, to explain or predict their appearance. It is in the course of this interaction between theory and experience that new ideas, discoveries and conceptions are born, including those that are sometimes called revolutionary breakthroughs in science.

The development of natural science and philosophy has shown that it is impossible to explain the whole wealth of the relationship between theory and experience and answer many important questions posed by the progress of science (particularly the question of the character of scientific revolutions) if one confines oneself to formal-logical analysis in considering these problems. A far more comprehensive approach embracing all the essential elements in man's search for knowledge is required.

It is generally accepted that the crisis of neopositivism and the decline of its prestige in the eyes of Western scientists and technologists are in large measure due to its failure to solve the above-mentioned problems from its chosen positions of empiricism and the absolutising of formal-logical methods.

Dialectical-materialist philosophy does not deny the role of formal-logical methods of research, social factors and individual creative activity in the process of cognition. But it shows the significance of these factors in relation to what constitutes the real essence of human cognition—the interaction of the subject and object in the process of practical activity. This interaction is interpreted and explained in Marxist philosophy on the basis of acknowledgement of the materiality of nature and society, the dialectics of objective reality and the reflection of the latter in consciousness, on the basis of the principle of the social character of cognition. Both the thought and practical activity of man are determined by the laws of objective reality. Man's subjective activity is not absolute and arbitrary; in the final analysis it is determined by external reality, by objective dialectics.

Clearly, then, the task of elaborating materialist dialectics on the basis of the natural sciences as a theory of objective dialectics is highly relevant today. It is true that materialist dialectics performs its philosophical function in relation to the natural sciences not directly but as a methodology. It is also true, however, that it is a general

theory and method of cognition inasmuch as it operates as the science of the most general laws and relations of the external world. Such problems as the interaction of subject and object, the nature of reality, the interconnection of the categories cannot be confined to the dialectics of the specific processes revealed by physics, chemistry, biology and other sciences; and yet no investigation is possible without them. This is why the elaboration of the philosophical problems of natural science was and remains the most important line of development of the dialectical-materialist world-outlook. We shall mention only some of the problems in the leading branches of natural science today that require a deep philosophical analysis.

Physics is regarded as the leader of modern natural science. It owes its dominant role to the fact that it is concerned with the primary, fundamental elements and properties of matter, and also that it has achieved the highest degree of organisation of knowledge and thus reflects most strikingly the basic features of modern science. Consequently the style of thought characteristic of physics exerts a very considerable influence on the style of scientific thought in general. The question of the status of physics, its ideas and methods, interests scientists in many fields. Further progress in chemistry and the whole complex of the biological sciences would be unthinkable in isolation from the development of physics. So we are faced with the complex task of investigating the interrelations and interdependence of the various levels of cognition, the form and structure in which knowledge is expressed, the nature of scientific theory, its logical structure and the sources of its development.

The influence of modern physics on the development of the whole complex of the sciences of nature is also directly expressed in the scientific world-outlook, as, for example, in the interpretation of the "eternal" philosophical problem of the interaction of subject and object. Modern physics provides a particularly striking illustration of the active nature of human cognition.

The profound philosophical interpretation of quantum theory called for a change in the traditional notions of causality as a rigid single-valued relationship. The synthesis of ideas that had hitherto seemed incompatible—causality and the basically probabilistic nature of quantum interactions—offers striking testimony to the incursion of dialectics into physics.

The problems of contemporary atomism as a doctrine concerning the principles of the structural organisation of matter are of major philosophical importance. The physical foundations of this doctrine are being worked out in the course of the development of the physics of elementary particles. This branch of science is on the threshold of discoveries and conclusions that may have consequences comparable to those of the creation of the theory of relativity and quantum mechanics. Under the influence of all these branches of physics there

has been a profound rethinking of the categories of structure, elementariness, space, time, causality, and so on.

Astronomy must also be included among the sciences that have leapt into the "frontal zone" of modern science. This science is experiencing a fresh period of revolution, discovering not only new and more profound properties of known objects, but also (and this is especially important) taking in formerly unknown regions of the universe, where astronomers are discovering a multitude of qualitatively new objects with unusual properties. Such objects include, for example, the active galactic nuclei, quasars and other quasi-stellar objects in which fantastic quantities of energy are discharged, pulsars which have turned out to be neutron stars, and so on.

Concepts based on fundamentally new ideas have been put forward with increasing frequency in recent years to explain the properties of such cosmic objects. In other words, our view of the universe is rapidly changing.

The abundance of new empirical material and the need for its theoretical interpretation have shaped new approaches to the solutions of some of the specific methodological problems of astronomy. But its tremendous current advance has led to the posing within its framework of a number of fundamental philosophical questions as well, concerning general method, world-outlook and the theory of knowledge. These questions are being sharply contested by the various philosophical trends.

In the course of the past 30-35 years a number of major philosophical problems, mainly methodological, have been posed by astrophysics. This science has now become a science of evolution studying not only the structure of its objects (as in the first stages of its development), but also their evolution. The problems of scientific inquiry in astrophysics, the principles of the construction and empirical testing of various theories are currently attracting the attention of many astrophysicists and giving rise to lively debates.

The advances in biology, which is also undergoing a period of extremely intensive and profound change, are no less significant. It is playing an ever more important part in the life of society. It would be no exaggeration to say that biology has entered a period of revolutionary development and mankind is on the eve of the "biological age" The justification for such appraisals is that biology is now becoming an exact science and its latest attainments have a direct effect on social life. This finds expression both in the wider industrial application of biology and in the new prospects it has revealed for prolonging man's active life, harnessing the whole planet to man's needs, and environmental adaptation in conditions of space exploration. All this increases the importance of the philosophical problems connected with biology and their significance in forming the natural scientific foundations of the Marxist world-outlook.

Without claiming to make any exhaustive analysis, we shall note some of the most important of these problems. First of all there are the philosophical studies dealing with the crucial problems of the sciences of organic life, its functioning and development, and the problems of the part-whole relationship.

Striking discoveries that have riveted attention to the biological sciences have been made in the course of the last twenty years thanks to the application of the ideas of physics, chemistry and cybernetics in the field of molecular biology. The fruitfulness of this analytical approach is beyond any doubt. But biologists themselves find it increasingly necessary to supplement it with the opposite, "systems" (or "integrative") approach. The latter is based on the principle of studying highly organised objects not simply as "wholes", but in the contradictory unity of their integrality and non-integrality.

The vigorous development of modern biology has made it necessary to formulate in concrete terms and illuminate from the positions of materialist-dialectical theory and method new approaches and principles that will most effectively help to unite and develop these basic trends in present-day biological research.

A wide circle of questions arises on the borderline between cybernetic and philosophical studies. The main point here is the philosophical interpretation of the new principles and concepts introduced into science by cybernetics, in particular the concepts of "information" and "control". Their use has given a new impulse to the further development of the Marxist-Leninist theory of reflection, in the direction of deeper analysis of the problem of the ideal, study of the genesis and mechanism of active reflection, investigation of the essence of the qualitative leap in man's creative activity and the activity of social systems, and study of the mechanisms of reflection of the future as well as the present.

Finally, several acute philosophical and social problems are posed by such a complex field of inquiry as the search for extra terrestrial civilisations and the possibility of establishing contact with them. Problems that only recently appeared to belong to the realm of fantasy are now evoking more and more serious interest.*

We have touched upon only a few of the most important directions taken in the philosophical generalisation of recent discoveries in natural science, the aim of which is not simply to interpret them from the standpoint of dialectical materialism, but to make a contribution to the philosophical comprehension of modern science. The main task in the field of dialectical materialism, and one that is pressingly posed by the development of science and social practice, is to elaborate the theory of materialist dialectics as an all-embracing, integrated system

* See *Communication with Extraterrestrial Intelligence (CETI)*, ed. by C. Sagan, the MIT Press, Massachusetts, 1973.

of laws and categories. Lenin in his time pointed out the need for a fundamental work that would sum up the development of all philosophical thought, the history of dialectics, and generalise the achievements of natural science, technology, the social sciences and social development. The fact that this task is now becoming a practical possibility, that the conditions for its accomplishment have been prepared by the whole course of development of dialectical-materialist philosophy in the USSR, offers vivid proof of the fruitfulness of Lenin's idea of an alliance between philosophy and natural science.

Some philosophers abroad are opposed to any such alliance and deny the need to elaborate the problems of objective dialectics, the dialectics of the material world. A fairly recent argument in support of this view is that the application of the laws of dialectics to nature or their deduction from nature would lead to a restoration of the old relationship between philosophy and the sciences, the old notion of philosophy as the science of sciences. L. Colletti, for instance, declares that the interpretation of the laws of dialectics as universal laws implies a revival of Hegelian idealism.* It is a well-known fact, however, that this was not the basis of Hegel's idealism. What makes Hegel an idealist is that he declares the processes occurring in reality, including nature, to be the self-movement of the Absolute Idea, of the logical categories. Critically elaborating Hegel's legacy, the founders of the philosophy of dialectical materialism showed that the dialectics of the categories reflects the dialectics of external reality, including the dialectics of nature itself. Failure to appreciate this fact has always weakened and undermined philosophy's role in prescribing method and building up a general picture of the world, and deprived it of the spur to development that is furnished by the sciences of nature. It was no accident that Lenin stressed in his *Philosophical Notebooks*: "Continuation of the work of Hegel and Marx must consist in the *dialectical* elaboration of the history of human thought, science and technique."** The successes achieved by Soviet philosophers and scientists in this field prove how fertile it is for Marxist philosophy itself and for the progress of the natural sciences.

One cannot help noticing that an increasing number of natural scientists in the West are coming to understand this fact. They appreciate not only the logic of investigating the philosophical problems of the natural sciences and the significance of their elaboration for the development of scientific cognition as a whole, but also the fruitfulness of the approach to these problems from the positions of dialectical materialism. The dialectical nature of the picture that scientists conceive when they try to elaborate a more or

* L. Colletti, *Il Marxismo e Hegel*, Bari, 1969.

** V. I. Lenin, *Collected Works*, Vol. 38, pp. 146-47.

less integral view of the world on the basis of the latest discoveries in science, impels them to the conclusion that the general methodology of the latter should be a philosophy consciously proceeding from the principle of universal development and interpreting it scientifically. Such a philosophy they find in Marxism.

This is not to say, of course, that neopositivism and neo-Thomism—the two main idealist trends claiming to be the philosophy of science today—have lost their hold over the scientists of the Western world. Nor have the sceptical attitudes that some of them adopt towards philosophy as a whole, the doubts as to the need for and purpose of contacts between scientists and philosophers been overcome.

Nor must we lose sight of the difficulties and complications, the contradictory nature of this movement towards dialectical materialism in the context of a dominant bourgeois ideology that is fundamentally hostile to it. For the most part it takes place unconsciously, slowly, and in some cases it is soon checked because the scientist cannot overcome the burden of prejudices and preconceived ideas with regard to Marxism, or because of the unfavourable ideological and political climate. Nevertheless this movement is growing. It expresses the irresistible mainstream of the historical process that is carrying mankind from capitalism towards socialism and communism.

At the beginning of this century, summing up the revolutionary changes in physics, Lenin noted that physics was moving towards dialectical materialism, that it was moving “not directly, but by zigzags, not consciously but instinctively”.* Since then natural science as a whole had made tremendous progress, but the contradiction between the objective, natural scientific premises for a swing in the direction of dialectical materialism and appreciation of the need for such a swing still remains. This contradiction is expressed in spontaneous natural scientific materialism. Let us recall that Lenin saw this as one of the possible steps towards dialectical materialism and stressed the need for an alliance with its representatives in the struggle “against the modish philosophical wanderings into idealism and scepticism which are prevalent in so-called educated society”.**

Natural scientific materialism, just as at the time when Lenin wrote these words, is still from the philosophical point of view a variegated trend by no means free of idealist errors and mechanistic and metaphysical ideas. But since then it has undergone some definite changes. Contemporary natural scientific materialism tends to be more aware of the objectivity of the external world and the objectivity

* V. I. Lenin, *Collected Works*, Vol. 14, p. 313.

** *Ibid.*, Vol. 33, p. 232.

of the content of scientific cognition. But it has inherited the fundamental narrowness of the “old” materialism—a fear of broad theoretical generalisations, the underestimation or direct denial of objective dialectics. This considerably weakens the positions of natural scientific materialism in the struggle against idealist conceptions and hinders its supporters in their progress towards dialectical materialism.

Life constantly offers fresh proof of the fact that the only philosophy that supplies the right answer to the basic questions raised by the development of nature, society and knowledge is Marxist-Leninist philosophy. Emphasising the dynamic quality of the dialectical-materialist world-outlook, Engels wrote: “With each epoch-making discovery even in the sphere of natural science it has to change its form, and after history also was subjected to materialistic treatment, a new avenue of development has opened here too.”* The way to accomplish this task in the context of the revolutionary changes taking place in natural science was pointed out by Lenin, who gave solid arguments for an alliance between natural scientists and philosophers.

* Karl Marx and Frederick Engels, *Selected Works*, in three volumes, Vol. 3, Moscow, 1973, p. 349.

T. I. OIZERMAN

THE PROBLEM OF THE SCIENTIFIC PHILOSOPHICAL WORLD-OUTLOOK

From the time of its inception to the present day Marxist philosophy has been characterised by two basic features—the rejection of philosophy in the traditional sense of the term and the critical assimilation of the major achievements of the philosophy of the past, particularly its materialist and dialectical traditions. This intrinsic contradiction in Marxism's historical development is quite often misinterpreted by the advocates of Marxism as well as its opponents. Some scholars overestimate the importance of continuity and tradition, while others lay too much stress on Marxism's rejection of previous philosophical doctrines.*

But the question of Marxism's relation to pre-Marxist philosophy (and non-Marxist philosophy in general) is a question not only of history but also of world-outlook. As the current controversies concerning the ideological legacy of the founders of Marxism tend to show, it is primarily a question of whether scientific philosophy is possible, of how it can be evolved. What we call "scientific philosophy" is not what modern positivism means when it speaks of the "philosophy of science". What we mean is a scientific philosophical world-outlook. This concept, which has taken shape in the course of the formation and development of Marxism, is

* Karl Kautsky, for example, clearly failed to grasp the essence of the Marxist *positive* negation of previous philosophy when he wrote: "I regard Marxism not as a philosophical doctrine but as an empirical science, as a special understanding of society" (see *Der Kampf*, No. 10, 1909, p. 452). Most of the theorists of the Second International shared this view and G. V. Plekhanov performed a great service by giving Marxist literature its first systematic substantiation of the proposition that Marx and Engels were philosophers in their own right, that they created a fundamentally new, *scientific* system of philosophical views, dialectical and historical materialism. "The appearance of Marx's materialist philosophy," Plekhanov wrote, "was a genuine revolution, the greatest in the history of human thought" (G. Plekhanov, *Selected Philosophical Works*, Vol. II, Moscow, 1976, p. 423).

organically opposed to contemporary non-Marxist philosophy whose advocates affirm almost unanimously that scientificity and world-outlook are mutually exclusive concepts. To make it clear what is meant by the Marxist conception of the scientific-philosophical world-outlook we must at least briefly elucidate the Marxist conception of philosophy, the Marxist interpretation of the relationship of philosophy to the natural and social sciences, on the one hand, and to social practice, on the other.

Marxism rejects the speculative thinker's counterposing of philosophy to the specialised sciences and practical life in general. Philosophy is not some mental construct sub specie aeternitatis towering above life. The illusion of the autonomy of the philosophical consciousness had some justification in the past, when philosophy was, in fact, the only (or, at any rate, historically, the first) form of systematic theoretical comprehension of man's picture of reality in all its manifold variety and, on the other hand, reflected the alienation of the individual in a society made up of antagonistic classes, an alienation which often emerged in philosophy as an antithesis between human reason and an irrational empirical reality that the philosophising reason sought to rationalise. Philosophy condemned the "irrational" in social reality and criticised it from the standpoint of the abstract moralising consciousness. It was, however, incapable of interpreting in scientific terms the very thing that it condemned. Moreover, as Marx and Engels demonstrated in *The German Ideology*, the speculative criticism of social reality often turned out to be a form of reconciliation with it, because the problem of changing reality was reduced to the changing of consciousness, that is, to giving a different interpretation of this reality. As regards the epistemological roots of the speculative counterposing of philosophy to the sciences and to practice, these must be sought in the disappearance of the original unity between knowledge and practical activity, that is, in the very fact of the emergence of theoretical knowledge, which by nature is relatively independent of practical activity and for this reason may, under certain circumstances, control it. In other words, the counterposing of philosophy to practice which arose with philosophy, and also the counterposing of philosophy to the natural sciences (most apparent in modern times, when these sciences broke away from philosophy), were organically connected with the development of theoretical knowledge.

This came about not because philosophers did not want to solve practical, particularly political problems. Quite the opposite is suggested by the example of Plato, the philosopher par excellence. The reason was rather that philosophy was not and could not yet become, because of the lack of development (or of one-sided development) of scientific theoretical knowledge, a specific scientific form of that knowledge. This, in our view, is what Marx and Engels

had in mind when they wrote: "One of the most difficult tasks confronting philosophers is to descend from the world of thought to the actual world."* This peculiar helplessness of philosophy was impressively demonstrated by German classical idealism, which nevertheless signposted the road along which philosophy was to become a specific science. The negation of traditional philosophy was therefore implicit in its most developed forms.

Scientific knowledge may be either empirical or theoretical; philosophy, on the other hand, is by its very nature theoretical knowledge. But not all theoretical knowledge is scientific knowledge; some theories are unscientific. Historically, the philosophy of Marxism takes shape as a specific form of scientific theoretical knowledge. It poses and solves its problems on the basis of the existing scientific data and practice. Consequently it does not admit the possibility of solving a philosophical problem if the required non-philosophical data are not available. Rejecting in principle the idea of a final and complete philosophical system ("absolute science", as Marx expressed it), Marxist philosophy is constantly in a state of development, on the road to new discoveries. It is constantly seeking the answers to its unsolved problems and, while criticising its ideological opponents, also criticises itself because it recognises the fact that it is limited by the bounds of knowledge so far achieved, both philosophical and scientific, which means that far from all the questions posed by the development of philosophy can be solved at present. Unlike the speculative idealist philosophy, which assumes that a philosophical system can solve any question by logical development of its fundamental premises, Marxism asserts that in philosophy (scientific philosophy), as in any other science, there are unsolved problems. But there are no philosophical problems that are insoluble in principle. As for the so-called pseudoproblems, they quite often turn out to be truly philosophical problems that have been incorrectly formulated. Like any system of scientific knowledge, the philosophy of Marxism regards its propositions only as an approximate reflection of reality which is corrected, developed and enriched in the course of further research.

Before considering the Marxist understanding of the relationship between philosophy and social practice we must take a closer look at the relationship between philosophical science and the specialised natural and social sciences. The argument as to whether philosophy is a science, and whether it can and should become one, is vital to a correct understanding of the actual, historically evolving relationship between philosophy and the specialised sciences, a relationship that in no small degree determines the status of philosophy in the modern world. We believe that this is the standpoint from which one should

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, p. 446.

assess both the rejection of the possibility of philosophy's being a science and the attempts to turn it into a specialised scientific discipline, and also the recognition of the need for philosophy as a "strictly defined science" albeit fundamentally different from everything else that is called science, as in Husserl's phenomenology, for instance.

The assertion that philosophy can and should be a science usually encounters the objection that science is only science because it deals with specific, specialised questions. Philosophy, however, does not deal with specialised questions, therefore it cannot be a science. This objection, so it seems to us, ignores the fact that science assumes not only a special kind of subject-matter but also a special method—the scientific method—of investigation. On these grounds philosophy can and should be scientific primarily in its methods of inquiry. This idea may be formulated in another way. Science is a developed, systematised form of true statements that is critically aware of its content. The necessity for limiting one's subject of inquiry is recognised and heeded by Marxist philosophy, which excludes from its terms of reference those questions that are not per se of a philosophical nature.

But philosophy, unlike the specialised sciences, cannot confine itself to any specific sphere of nature, society or the process of cognition. The principle of maximum limitation of the subject-matter of philosophy proclaimed by some modern philosophers (the adherents of the analytical or linguistic school, for instance) contradicts the very essence of philosophy. Scientific philosophy therefore differs substantially from any specialised science in that it cannot be a specialised science. This is true not only of the content of philosophy but also of the specific methods of inquiry which we call philosophical. Whereas the specialised sciences, for example, investigate the specific laws governing the behaviour of phenomena in certain closely defined spheres (particularly, the forms of the motion of matter), philosophy is mainly interested in the general nature of the laws revealed by the specialised sciences. Philosophy therefore asks such questions as: What is a law? In what way do the laws of nature differ from the laws of the socio-historical process? Do there exist any universal laws embracing all phenomena? What are the relations, the interconnections between phenomena, that are not laws?

The list of questions concerning the concept of law could, of course, be extended to include dozens of other queries, most of which register facts revealed by the specialised sciences and by everyday life and historical experience.

For centuries philosophy existed partly outside science and partly within it. The transformation of philosophy into a system of scientific philosophical views constitutes not a denial of the traditional philosophical problems, but their specifically scientific postulation.

Admittedly, scientific philosophy rejects the ideal of absolute knowledge, regarding the absolute not merely as unattainable but rather as insufficiently meaningful and setting in advance a limit on the further development of knowledge. As of old, philosophy still seeks to know the infinite, the universal, the intransient, to discover the essence of essence (while realising that even this is not the final limit), in view of which the universal and necessary significance of its theoretical propositions is constantly in a process of becoming and developing. This also distinguishes philosophy from the specialised sciences, particularly the so-called deductive sciences. But this special feature of philosophy impels it to rely on scientific methods of inquiry, on scientific discoveries, the interpretation of which points the way to new philosophical orientations. By way of illustration one has only to recall the immense influence exerted on philosophical thought by Copernicus' heliocentric system, by classical mechanics, Darwinism, the theory of relativity, quantum physics, the discovery of atomic energy, man's breakthrough into space, and so on.

Hegel, who brilliantly demonstrated the paramount importance for the further development of philosophy of synthesising the philosophical ideas of the past, did not, alas, fully appreciate the fact that philosophy also develops by means of interpretation of the scientific discoveries of its time and the methods by which they were made. The significance of such philosophical generalisations, which was relatively small in ancient and medieval times, has grown tremendously in the modern age and particularly today, when the theory of relativity, quantum mechanics, nuclear physics and molecular biology have revealed to man an entirely new world of things, new dimensions of objective reality. These discoveries have emphatically reaffirmed the truth that today philosophy is impossible without critical interpretation and summarising not only of the philosophy of the past but also of the science of the present. Only the closest association with the specialised sciences enables philosophy to draw inferences that are not given in any of these sciences. This becomes possible not because philosophy corrects the data of the specialised sciences; for one thing, it lacks the equipment, the means for that. Scientific philosophy does not claim superscientific knowledge and renounces in principle the whole idea of any such knowledge. But by taking into consideration the history of cognition and its prospects scientific philosophy brings out the universal implications of scientific discoveries, the difference they make to our world-outlook, and prevents the absolutising of the conclusions reached by the specialised sciences at any historically limited stage of their development. This is what enables the philosophers to reach conclusions that do not contradict the data of the specialised sciences, although they are not given in these sciences. Awareness of the historical horizons and perspectives, the methodological assumptions of scientific knowledge at the level

already attained—this is what scientific philosophy gives the specialised sciences, on the basis of the data they themselves provide.

However, scientific philosophy is scientific not only because it is organically connected with the specialised sciences, assimilates the criteria of scientificity that they evolve, and solves its problems on the basis of scientific data. It is scientific also because of its organic connection with all the manifold forms of society's intellectual and practical life, with current and historical experience, which philosophy summarises and interprets, solving its problems on this basis.

Our daily experiences tell us about all kinds of important things—that people are born and die, fall asleep and awaken, feel joy and sorrow, take various attitudes to one another, love and hate, seek to achieve various goals, grow old, fall ill, and so on. It would be naive to assume that these facts which evoked the curiosity of the earliest philosophers are of no interest to the philosophy of today. Philosophy took shape historically as the theoretical interpretation of fundamental facts which, though universally observed, remained incomprehensible. It therefore interprets that which, though known, is far from being understood; it meditates upon a world that is open to all. And at every stage in its development it invariably returns to this world of everyday experience, reinterpreting it from new historical and theoretical positions. No wonder, then, that we regard any abandoning of this humanist tradition as one-sided "scientism". The defect of the latter lies not in its orientation on philosophical problems generated by the development of the specialised sciences, but in its reduction of philosophy to a specialised scientific discipline, in the ignoring of people's manifold practical activity, in the one-sided interpretation of human experience and man himself (as only the knower, the subject of knowledge), in a word, in the ignoring of the problem of man, which in modern times, and particularly today, has become one of philosophy's most important themes.

Marxism presented philosophy with a wealth of human historical experience that Hegel and other great philosophers had only vaguely perceived. There is no need to prove that historical events, particularly those of the time in which he lives, shape the philosopher's outlook and views, determine his attitude to philosophical tradition, and also to problems which are not in themselves philosophical but stimulate philosophical interest, suggest new philosophical ideas or lead to the regeneration and remoulding of old ones that appeared to have been consigned to oblivion. Indeed it may be said that the great philosophical doctrines are epoch-making events of world history. And not only because they constitute epochs in man's mental development. Each of these doctrines is the spiritual quintessence of its time. It authentically expresses the needs of the historical epoch, its argument with the opposing forces of past and

present, its intellectual, moral and social ideal. This fact is often construed relatively, that is, as recognition of the fact that *tempora mutantur, nos et mutamur in illis* (Times change and we change with them). But, in fact, the real point is something quite different. The historical course of events in the life of peoples, the unforeseen results of the activity of people in the mass, the collapse of social institutions that had appeared to be eternal and inseparable from human existence, even divinely established, the historical emergence of new social forces, classes and peoples which played only a minor role in the past—all this (and much else composing the fabric of world history) breaks down illusions and dogmas, makes the apparently impossible a reality, reveals what was once a secret, teaches and enlightens.

Who today would maintain that because of certain congenital differences some people are destined to be slaves and others masters? But this was what the great philosophers of the ancient world maintained, and this was what people's everyday experience in that world taught them. Why is this assertion never made nowadays, even by those who in practice are prepared to support contemporary forms of slavery, some of which are even more cruel than those of the past? It would appear that even those who have learned no lesson from historical experience are compelled to reckon with the convictions of the overwhelming majority of mankind, convictions derived from world history.

Would many thinkers in our day attempt to prove that private ownership of the means of production has always existed and will continue to exist for ever? Clearly there are few who would maintain this statement *as it stands*. Those who unconditionally defend the principle of private property identify it with property in general, or with personal property, to which no one objects. The history of mankind compels us to delimit the forms of property. Even the most stubborn opponents of historical determinism realise today that the abolition of slavery and serfdom was inevitable. They have been persuaded not by theoretical arguments but by historical facts and the universal confidence generated by these facts in the consciousness of the great mass of mankind. This is not to say, however, that they acknowledge historical necessity in general, that is to say, the essential connection between certain social events of past, present and future.

To be sure, history not only destroys illusions; it quite frequently generates new ones. It is no argument merely to refer to the evidence of history. Historical experience is a subject of philosophical inquiry which leads some thinkers to scepticism and misanthropy, and others to positive views nourished by the lessons of the past.

The rise and development of Marxist philosophy is historically related to the theoretical interpretation of *revolutionary practice*, the

movement for the emancipation of the working class. The task of overcoming the gap between philosophical theory and non-philosophical practice was proclaimed by many outstanding pre-Marxist philosophers, but always on a limited plane. Some philosophers reduced this task to the moral perfecting of the human personality, while others proposed that philosophy should devote itself to mastering the spontaneous forces of nature. The framework of pre-Marxist idealist and metaphysical-materialist doctrines was too narrow, however, to evolve any scientific understanding of social practice as universal human activity. None of these doctrines were able to overcome the abstract counterposing of philosophical theory and practical activity. And yet practical activity, as historical experience has shown, can and should become conscious, cognitive, thinking activity (and hence the activity of scientific and philosophical thought).

The illusions of the philosophers who believed that by their theorising they had risen above society, a society which did not satisfy them, even though some held it to be the only society that could exist, had their roots in the antagonistic nature of social progress. "The *philosopher*," Marx wrote, "who is himself an abstract form of estranged man—takes himself as the *criterion* of the estranged world." * But this very same philosopher, who belongs to the most educated and intellectual section of the ruling class and is trained in the traditions of that class, cannot perceive the true source of the alienation of intellectual creativity. On the contrary, in view of this alienation he believes himself to be spiritually independent of the social forces whose interests he expresses, often without any sense of personal commitment to them.

Philosophy, regarded as alienated social consciousness in the context of a society divided into hostile classes, was, as Marx and Engels wrote, "only the transcendent, abstract expression of the actual state of things", and because of this, "its *imaginary difference* from the world, must have imagined it had left the actual state of things and real human beings far below itself. On the other hand, it seems that because philosophy is not *really* different from the world it could not pronounce any *real judgment* on it, it could not bring any real differentiating force to bear on it and could therefore not interfere *practically*, but had to be satisfied at most with a practice *in abstracto*."** We believe that this profound observation highlights the organic connection that is so characteristic of all pre-Marxist philosophy between contemplativeness, illusory impartiality and the purely speculative criticism of alienated social relations. We have

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 3, Moscow, 1975, p. 331.

** *Ibid.*, Vol. 7, Moscow, 1976, pp. 39-40.

spoken of pre-Marxist philosophy, but its fundamental features are to be found to a greater or lesser extent in contemporary non-Marxist philosophy as well. Here we have the key to Marxism's attitude to non-Marxist philosophy. Since this philosophy reflects the historical experience of the present epoch, it is definitely of some positive interest to Marxists, but to the extent that this philosophy justifies the capitalist status quo, it is Marxism's ideological opponent.

Marx said that philosophers had only interpreted the world in various ways, but the task was to change it. This famous proposition states, on the one hand, that interpretation constitutes the basic form of development of philosophical knowledge and, on the other, condemns the philosophy that restricts itself to the mere interpretation of what exists. The critics of Marxism usually misinterpret Marx's proposition as a demand that one should renounce the interpretation of reality and thus abolish philosophy entirely in favour of revolutionary action. This is an obvious misunderstanding of Marx, who demonstrated throughout his teaching the necessity for unity of revolutionary practice and revolutionary theory, that is, an interpretation of social reality that provides grounds for, and the method of, its revolutionary transformation. Need it be proved that such an interpretation of reality involves nothing extraneous to that reality? Change and development are an immanent feature of reality and Marxism proceeds from this fact.

Of course, Marx's proposition is only a thesis which, to be fully understood, must be set within the context of Marxist teaching as a whole. This fact is usually ignored by Marx's critics, who lift this thesis out of its context and thus blind themselves to its real meaning. What Marx actually intended was to contrast the conservative interpretation of the world, which had become the prevalent tendency in philosophy, with its revolutionary interpretation. He was renouncing the idealist and metaphysical interpretations of the world, which ultimately lead to conservative socio-political conclusions, by working out the principles of the revolutionary interpretation of changing, developing reality with the aim of its conscious transformation in the interests of the working masses.

Examination of the relationship between Marxist philosophy and social practice uncovers its inherent ideological function. Philosophy — and this is true of any philosophy — is not only a special method of inquiry; it is also a specific form of social consciousness, that is, a reflection of *social* being.

It is as the reflection of social being that Marxist philosophy is an ideology, a *scientific* ideology. This means that Marxist philosophy differs essentially from other philosophical doctrines in its scientific method of solving its ideological problems. To elucidate this important feature of Marxist-Leninist philosophy one has to answer certain questions relating to the term "scientific ideology". What, for

instance, is the difference between science and social consciousness? How can there be such a thing as scientific ideology? In what way does scientific ideology differ from science?

The need to sort out the relative distinctions between the sciences and the forms of social consciousness is particularly relevant to philosophy, because philosophy has to do with both the one and the other. The sciences are distinguished from one another mainly according to their subject-matter. It is the subject-matter of a science that determines its specific nature, its functional purpose, that is, its position in the system of the social division of labour. Accordingly, the social function of physics differs substantially from the social function of political economy. As for the forms of social consciousness, the specific nature of each is determined mainly by the social function that it performs. It need scarcely be proved that art has one social function and religion another. It is quite obvious that this difference of function cannot be attributed to the nature of the inquiry, first because art and religion are not, strictly speaking, engaged in inquiry and hence have no subject of *inquiry*, and, secondly, because their specifics are determined not by their subject-matter but by certain social relationships.

Social consciousness is a reflection of social being but reflection is not in itself, of course, the same as investigation. Cognition, and particularly inquiry, research, is a higher, specialised form of reflection of objective reality. Such investigation is performed by professional researchers, while the reflection of objective reality (natural or social) takes place in people's everyday consciousness, often without any conscious effort on their part. The investigation of social being is, like all cognition, infinite. On the other hand, social consciousness within the confines of a definite historical epoch (the society of the ancient world, feudal society, and so on) assumes a relatively perfect form, in which essential changes are brought about mainly by radical socio-economic transformations. This is evidently what Marx had in mind when he stated that in studying social revolutions "it is always necessary to distinguish between the material transformation of the economic conditions of production, which can be determined with the precision of natural science, and the legal, political, religious, artistic or philosophic—in short, ideological forms in which men become conscious of this conflict and fight it out".*

Thus the distinction between science and social consciousness has an objective basis, which does not, of course, give grounds for counterposing them in an anti-dialectical way. The distinction takes place within the framework of identity because cognition is conscious

* Karl Marx, *A Contribution to the Critique of Political Economy*, Moscow, 1970, p. 21.

activity, although not all conscious activity is cognition. Difference is no less important than identity, and in certain circumstances, when difference grows into contradiction, it becomes more important than identity. Ideology is a specific form of social consciousness. The possibility of scientific ideology presupposes a critical analysis of the content of the spontaneously formed social consciousness and examination of this content in the light of the facts that it reflects, a scientific assessment of these facts. Moreover we must bear in mind that scientific investigation of social consciousness becomes all the more necessary as social movement acquires a conscious organised character. This need is, of course, also stimulated by the development of the social sciences, which makes possible the scientific understanding and substantiation of certain social needs and interests.

The status of philosophy in the history of man's intellectual development is in no small degree determined by the fact that, on the one hand, it is investigation while, on the other, it is a form of social consciousness like art, religion, and so on. As a form of investigation, philosophy, despite its unique features, basically resembles any of the other sciences. As a form of social consciousness, it naturally differs from science, and this, so it seems to us, constitutes one of the main sources of the progressive divergence of philosophical doctrines. It was Marxism that first made philosophy, as a form of social consciousness, the subject of scientific inquiry. Pre-Marxist philosophers ignored philosophy's ideological function. They regarded philosophy as a science and sometimes as something above science or as having existed long before science, regardless of any historically determined social relations. If in a few individual cases it was recognised that philosophy depended on social relations, this dependence was usually put down to some kind of distortion, to philosophy's betrayal of its true vocation. It was this that gave rise to the illusion of philosophy's "impartiality", its disinterestedness and unbiased approach, an illusion with deep-going social and theoretical roots. The concept of the *social* consciousness and the scientific conception of ideology were evolved on the basis of the materialist understanding of history, which made it possible to isolate *social* being as a specific target of scientific philosophical inquiry.

The founders of Marxism used the term "ideology" in the negative sense that it had historically acquired in their day. Ideology was their term for the illusory social consciousness, particularly the speculative, idealist mystification of objective reality. But Marx and Engels pointed out that only the form of ideology was illusory, not its content. This immediately opened the way for the creation of scientific ideology, which was in fact evolved by Marx and Engels, although they never actually formulated any such concept. The concept was theoretically developed in the works of Lenin.

When investigating social reality, Marxism proceeds not from ideology, not from consciousness in general, but from the actual living, historical process, which is independent of consciousness. The analysis of this process explains its reflection, including its ideological form. The categorical imperative of Marxist sociology could, tentatively, be formulated as follows: One must return from notions and ideas concerning things to the things themselves, so that by means of scientific investigation one can know their true relationships, discover the mechanism of their distorted reflection in people's consciousness and replace these distorted images of reality by an accurate, scientific reflection. This way of stating the problem differs considerably from the notions of ideology that were widespread in Marx and Engels' time, which treated it as a collection of ideas about reality devoid of objective content and cognitive significance. For example, when describing the social doctrine of the French materialists of the 18th century, who presented all individual activity and intercourse as relations of mutual utilisation, Marx and Engels showed that this utilitarian conception reflected the practice of the capitalist society that was growing up in France at the time. "The apparent absurdity of merging all the manifold relationships of people in the *one* relation of usefulness, this apparently metaphysical abstraction arises from the fact that in modern bourgeois society all relations are subordinated in practice to the one abstract monetary-commercial relation."* This assessment of the actual content of an ideological conception and the indication of its class limitations was by no means a denial of its progressive historical nature or its contribution to the scientific view of social relations and the nature of morality. Pointing out that "Holbach's theory is the historically justified philosophical illusion about the bourgeoisie just then developing in France, whose thirst for exploitation could still be regarded as a thirst for the full development of individuals in conditions of intercourse freed from the old feudal fetters", Marx and Engels noted not only the historically progressive character of this theory but also the kernel of profound truth which it contained. "Liberation from the standpoint of the bourgeoisie," Marx and Engels pointed out, "i.e., competition, was, of course, for the eighteenth century the only possible way of offering the individuals a new career for freer development. The theoretical proclamation of the consciousness corresponding to this bourgeois practice, of the consciousness of mutual exploitation as the universal mutual relation of all individuals, was also a bold and open step forward. It was a kind of *enlightenment* which interpreted the political, patriarchal, religious and sentimental embellishment of exploitation under feudalism in a secular way; the embellishment corresponded to the form of exploitation existing at

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, p. 409.

that time and it has been systematised especially by the theoretical writers of the absolute monarchy.”*

We thus find in Marx and Engels a profound analysis not only of the form but also of the actual content of ideology, and this in fact argues the need for a positive ideology as a necessary social phenomenon. It also constitutes a most important theoretical precondition of the scientific understanding of ideology. If the founders of Marxism nevertheless refer to ideology as false social consciousness, it must be remembered that they used the term “ideology” only to define the social consciousness of the politically (or economically) dominant exploiting classes. In working out the *scientific* theory of the movement of the proletariat for liberation, in creating a scientific socialist ideology, they did not give it the designation of “ideology” This fact, however, did not prevent Marx and Engels from noting scientific views in those ideological systems where such views existed. In Marx’s economic researches we find a profound analysis of the ideological illusions of the classical exponents of English political economy. While exposing these illusions, however, Marx constantly emphasises the *scientific* character of classical English political economy, contrasting it with the theories of the vulgar economists who, instead of investigating the economic relations of capitalism, gave a deliberate apology for them. Marx further explained that even vulgar political economy is not without meaning because it reflects an objective reality, the external, superficial form in which capitalist relations are manifested, but a form that is uncritical and unscientific.

Vulgar political economy, Marx pointed out, provides a theoretical basis for the ideas of the prevalent bourgeois consciousness. This does not mean, of course, that any ideology may ultimately be regarded as the ideas of an ordinary class consciousness. English classical political economy, the ideology of bourgeois Enlightenment and other historically progressive bourgeois doctrines, despite their class limitations, came into conflict with the everyday bourgeois notions of their time. Insofar as they contained elements of a scientific understanding of reality they anticipated the social practice of the bourgeoisie. Anticipatory reflection of social reality—advance knowledge of the trends of its development, orientation towards the future, the theoretical elaboration of new social criteria, ideals and historical goals—is a characteristic feature of the historically progressive ideology.

So, the fact that the founders of Marxism did not describe the system of scientific communist views which they had evolved as an ideology, while at the same time emphasising that this system of views expressed the fundamental interests of the working class, was by no

* Ibid., p. 410.

means accidental because it reflects the objective logic of historical development, which led to the emergence of Marxism. Marx and Engels contrasted the social theory they had evolved with bourgeois social consciousness, dissociating themselves from the unscientific ideologies that dominated the working-class movement at the time. For this reason the assertion that the founders of Marxism rejected all ideology in principle, an assertion which at first glance may be fully confirmed by quotations from Marx and Engels, seems to us extremely superficial. One might just as well claim, for example, that Marx and Engels rejected all philosophy, whereas in reality Marxism, as we have already stated, only rejects the philosophy of the old, traditional type. This perfectly justifiable analogy indicates the specific, dialectical character of negation. This is the negation of negation, that is, the creation of a fundamentally new, scientific ideology. The fact that in the works of Marx and Engels we do not find the expression "scientific ideology", that they contrasted to the "German ideology", for example, and ideology in general, the social science which they had created, can mislead those who underestimate the complex and contradictory nature of the historical process of the emergence of a new scientific theory that is fundamentally different from its predecessors, or who try to counterpose Marx and Lenin on the grounds that Lenin, in developing the teaching of the founders of Marxism, formulated a concept of scientific ideology which, formally speaking, is not to be found in the works of Marx and Engels, although their doctrine implied it.*

Scientific ideology is a system of regulative ideas, notions, ideals, imperatives, based on a specialised investigation of the social process, which reflects the position, needs, interests and aspirations of a definite class, social group or the whole of society and gives them their permanent social orientation. Social theory is an ideology not because it gives a distorted reflection of reality but because it reflects,

* This, of course, is not the only instance when Lenin, basing himself on the propositions of Marx and Engels and enriching them with new historical experience, formulated new concepts which, as he himself often stressed, were already outlined by the founders of Marxism. These include, for example, the concepts of the bourgeois-democratic revolution and the revolutionary-democratic dictatorship of the proletariat and the peasantry which Lenin introduced into Marxist theory. Regarding the latter concept, Lenin refers to the experience of the German revolution of 1848, which Marx and Engels generalised. "There is no doubt that by learning from the experience of Germany as elucidated by Marx, we can arrive at no other slogan for a decisive victory of the revolution than: a revolutionary-democratic dictatorship of the proletariat and the peasantry," Lenin wrote (*Collected Works*, Vol. 9, p. 136). The Mensheviks regarded Lenin's idea of the revolutionary-democratic dictatorship of the proletariat and the peasantry as incompatible with Marxist doctrine because they interpreted this doctrine dogmatically and failed to understand the true historical path to the establishment of the dictatorship of the working class. Lenin frequently stressed that loyalty to the spirit of Marxism lies in the creative development of its propositions.

assesses the given historical reality and the whole socio-historical process from definite social positions. We stress the fact that they are *social* positions, and not merely the personal, subjective positions of the researcher, who must of course abandon the personal in the process of his study if he is a real scientist.

For a scientific ideology to appear there must be a class, whose interests coincide with the objective trends of the socio-historical process, and there must be theoreticians of this class who are capable of scientifically comprehending this unity of the subjective and the objective.

A scientific ideology can be created only in certain historical conditions and by means of a comprehensive scientific investigation of social life. The ruling classes of the ancient world, of feudal and bourgeois society, did in their day express the interests of social development, they were the agents of historical necessity. Nevertheless, their ideologists never produced a scientific ideology. The progressive bourgeoisie in the person of its most outstanding ideologists created economic, historical and legal science, and philosophical materialism. But the concept of scientific ideology cannot be applied to these scientific theories because scientific ideology presupposes cognition of one's own historical, class content, origin, significance and relationship to other ideologies, classes and epochs. Hence it must be free of idealist illusions and claims to intransient extra-historical significance. The scientific socialist ideology meets these criteria. Regarded from this standpoint, scientific ideology is clearly on a higher scientific plane than a scientific theory, such as Ricardo's theory of labour value.

Marxism (and this is also true of the philosophy of Marxism) is a unity of science and scientific ideology, a unity which does not, however, erase the difference between them. This difference will become manifest when the world has rid itself of social inequality, exploitation, political oppression, racial and national discrimination and war, and when, consequently, the problems of the class struggle, socialist revolution and the dictatorship of the working class are relegated to the historical past. But the science created by the founders of Marxism and their successors will undoubtedly retain its significance as a scientific philosophical world-outlook, a theory of social creativity and a methodology of scientific research. This science will develop and be enriched with new discoveries.

Any ideology, including the scientific ideology, is only valid within the historical limits of its possible social application. From this standpoint any ideology is historically transient. The significance of science is determined exclusively by the limits of the objective truth it contains and the possibilities of its further development. In this sense science, insofar as it remains such, retains its intransient significance as the only accurate expression of the "living, fertile, genuine,

powerful, omnipotent, objective, absolute human knowledge” * It is from this standpoint, so it seems to us, that we have to approach the problem of the ideological function of the cognitive process, including philosophical cognition.

The philosophical doctrines of Heraclitus, Democritus, Plato, Aristotle and other thinkers of the ancient world performed certain ideological functions. It is not difficult to see the social significance of Heraclitus' interpretation of dialectics as a constant returning, or the struggle of opposites as an unending war. It is even easier to discover the ideological significance of Plato's theory of the state. But Heraclitus' dialectics, the atomic theory of Democritus, or Plato's theory of ideas cannot, of course, be reduced to the ideological interpretation of reality. This is due not only to the fact that cognition, and particularly philosophy, studies the natural as well as the social reality. The main point is that the ideological function of cognition is an inseparable part, but only a part, of an all-embracing cognitive process that is of unlimited content and significance. Cognition expresses the needs of social production, both material and spiritual. It forms a many-sided sphere of man's spiritual life, which like all human life is an end in itself as well as a means.

The dialectical interpretation of the unity of philosophy and ideology rules out any notion that they may be regarded as the same thing. In some respects the concept of philosophy is broader than that of ideology; in others the concept of ideology has wider scope than philosophy because of the numerous forms of non-philosophical ideology. Philosophical knowledge is relatively independent within the framework of the unity of philosophy and ideology. This independence derives from its origin, subject-matter and the possibility of its non-ideological application. This relative independence of philosophical knowledge explains the relationship of historical continuity between philosophical doctrines that differ radically in their ideological orientation. Marxism arises and develops in the struggle with bourgeois ideology, and yet, as Lenin emphasised, Marxism is the direct and immediate continuation of the most outstanding philosophical, economic and sociological doctrines evolved by the ideologists of the progressive bourgeoisie. This is a contradiction of historical reality, in which philosophical knowledge always performs a definite ideological function, while at the same time remaining knowledge which, like any knowledge, does not depend on its application.

The natural sciences as well as philosophy and social theories also have a certain ideological function because their discoveries dispose of superstitions and illusions that play a definite ideological role. Modern natural science exposes racialism, the neo-Malthusian

* V. I. Lenin, *Collected Works*, Vol. 38, p. 363.

apology for war, and so on. This shows that under certain circumstances the natural sciences have an ideological function. There is no such thing as bourgeois (or communist) physics, chemistry, etc., but there are various ideological interpretations of the major discoveries made in the natural sciences. Thus, the non-ideological, natural scientific sphere of knowledge also reveals the contrasts between various ideological approaches. This means that scientists also take part in the ideological struggle insofar as they evaluate not the special but the social significance of discoveries, the prospects of science and its role in solving social problems.

Today, when natural science increasingly determines the character and rate of development of material production, natural scientists, like philosophers, sociologists and economists, are compelled to question themselves about the practical application of their discoveries, the social consequences of scientific and technological progress, which depend on the character of the social system, the correlation of the various classes of society, politics, and so on. It is no accident that outside his special field the natural scientist takes up a definite ideological position, as can be seen, for example, from the active participation of many eminent natural scientists in the struggle for peace and efforts to prevent the military use of the discoveries made by nuclear physics, chemistry, and bacteriology.

Thus the comparative analysis of philosophy, the natural and social sciences, and ideology, reveals not only a difference between these forms of the intellectual mastery of objective reality, but also their unity and consequently the possibility of a scientific philosophy performing certain ideological functions. Marxism makes this possibility a reality. Whereas the neopositivists maintain that philosophy (which they interpret in a subjectivist, agnostic spirit) must be stripped of ideology if it is to become scientific, the Marxists regard "deideologising" as a hypocritical form of bourgeois partisanship adorned with the fig leaf of impartiality. Partisanship, Lenin wrote, is a socialist idea, non-partisanship is a bourgeois idea. Scientific ideology is the necessary expression of proletarian, socialist partisanship. A philosophy that renounces its ideological function cannot be scientific.

The Marxist understanding of the possibility and necessity of scientific philosophy has certain premises, of course. Chief among these is acknowledgement that the pluralism of philosophical systems must be regarded as a historically transient form of the establishment of philosophy as a science, that is, acknowledgement of the possibility and necessity of the overcoming of this pluralism under certain social conditions. In this sense the person who believes the continuing divergence of philosophical systems to be the everlasting form of development of philosophical knowledge, is morally bound, of course, to renounce the concept of philosophy as a science, and also any

attempt to define the concept of philosophy in general. If such is his belief he must naturally rule out in principle any possibility of the development of philosophy on a collaborative basis, as in all the other sciences. For such a thinker the deepening divergence of philosophical doctrines is the highest manifestation of the free philosophical spirit, whose sole need is to assert itself. He is therefore bound to maintain that the true value of a philosophical doctrine has nothing to do with truth, which for philosophy must be recognised as merely a fortuitous possibility. But if this is so, our opponent must put the philosopher on the same plane as the popular novelist whose work depends for its power of attraction on being different from any other novels yet written.

The classical pre-Marxist philosophers regarded the fact of the coexistence, the competition and replacement of numerous systems as a sign of the weakness of philosophy, which must be overcome by devising scientific methods of inquiry into philosophical problems; but the majority of contemporary philosophers, following Wilhelm Dilthey, regard the anarchy of philosophical systems as a normal situation peculiar to philosophy. For example, the philosopher of the irrationalist school is convinced that belief in the truth of one's philosophical views is really an illusion or even a superstition. He therefore postulates the idea that all existing and possible philosophical doctrines are untrue but possess the attractive force of truth because each of them has its own meaning, at any rate, for those who can find it. It need not be thought that the neopositivist differs essentially from the irrationalist on this point. He merely tries to back up his subjectivist understanding of philosophy with scientific arguments.

So, from our point of view, the concept of scientific philosophy (like the scientific definition of the concept of philosophy) demands theoretical premises that are fully accepted only by dialectical and historical materialism. Acknowledgement of the historically transient nature of the divergence of philosophical doctrines, however, has nothing in common with denial of its necessity and progressive nature in certain historical periods. In other words, the deepening divergence of philosophical doctrines, the polarisation of philosophy into irreconcilably opposite systems of beliefs, played its positive role. It was necessary to the extent that humanity had to develop and try out a multitude of philosophical hypotheses in order subsequently to accept as a basis, a point of departure, the one that found greatest confirmation in scientific data, and everyday and historical experience.

The anarchy of philosophical doctrines was to a certain extent justified until the development of science and practice provided the necessary preconditions for the development of scientific philosophy. It is also obvious that the pluralism of philosophical systems was

related to the ideological function of philosophy and particularly the absence of scientific ideology. But since philosophy develops and does not merely vary in time, since scientific ideology arises and develops, certain inevitable errors and misconceptions are overcome and not merely replaced by new ones. Even idealist philosophy has recourse to positive scientific data to fortify its unscientific propositions. The diversity of incompatible philosophical doctrines loses its historical justification not through the convergence of philosophical doctrines, which is fundamentally impossible, but through the development of a scientific approach to the solving of philosophical problems, an approach which demands that a doctrine must be a special kind of research, a scientifically grounded interpretation of reality, and not just a notion conjured up by some individual thinker.

Leaving the motley crowd of incompatible philosophical doctrines to the past, Marxist philosophy offers instead of the pluralism of speculative conceptions the all-round development of philosophical propositions that have been confirmed by life, practice and science. This theoretical position is radically different from the belief prevalent in contemporary non-Marxist philosophy, according to which philosophising is a kind of search for knowledge that yields a certain intellectual satisfaction but no results that may be called truths. The supporters of this view regard philosophy as a labyrinth from which only those who dislike philosophy or overestimate their philosophical potential and the scope of knowledge in general would wish to escape. Ariadne's thread, so these philosophers maintain, does not exist and would not be needed if it did. Philosophy will never become a science, that is, it will never betray its true nature and consequently will always remain the realm of absolutely sovereign philosophical systems, like the world of Leibniz's monads, with the only difference, however, that it has no hierarchy or predestined harmony. The things that accord in the different philosophical doctrines are of no interest to the philosopher who takes this stand. Philosophising must remain only an attempt in which failure, depending on one's frame of mind, may be interpreted either as inevitable defeat or as an everlasting prospect. The idea of scientific philosophy is quite untenable and can inspire only the ignorant. It is not difficult to see that the fundamental fault in all these arguments lies in their ignoring the fact that philosophical doctrines have become polarised into *main directions*, in their denial of the fact that the divergence of philosophical doctrines is at the same time the development of diversified forms of the fundamental opposition between materialism and idealism, so that the meaning and significance of all other philosophical trends and schools can be correctly understood only in their relationship to materialist philosophy, on the one hand, and idealist philosophy, on the other. It is in the existence

of a multitude of philosophical doctrines that the diversity of the forms of development of materialism and idealism manifests itself historically. By highlighting the *main* philosophical trends and elucidating their relationship to the other trends, schools, etc., we prove that the philosopher cannot evade a choice. To philosophise is to choose.

Materialism or idealism—such is the unavoidable alternative in philosophy. These two world-outlooks are incompatible, and this is far more obvious today than at any time in the past. The need to solve the dilemma that sums up the historical experience of philosophical development, recognition of the fact that there is no alternative to idealism but materialism, all this does away with the superficial understanding of philosophy as a labyrinth in which all paths are blind alleys. The choice which the philosopher (and to some extent anyone studying philosophy) must make is ultimately a choice not between many but between two mutually exclusive decisions. Here one chooses one's philosophical future, so to speak, after which comes the choice of this or that specific variety of materialism or idealism.

It would be extremely superficial to underestimate the importance of this second choice. Materialism and idealism do not exist in any pure form, isolated from other not only numerous but meaningful trends. Materialism may be dialectical or, on the contrary, metaphysical, mechanistic, or even vulgar. These are not only various historical stages of development of one and the same doctrine; they are also varieties of materialism that exist today. And a study of contemporary bourgeois philosophy shows that those of its philosophers who, having overcome the prevalent ideological prejudices of capitalism, embrace the positions of materialism by no means always make the best of this second and decisive choice.

It would be an even greater and more disastrous mistake to underestimate the significance of philosophical self-determination, that is to say, to assume, as sometimes happens among specialists with highly restricted research interests, that one can do without a philosophical world-outlook altogether. In this statement of the problem, in philosophical nihilism, one sees a tremendous failure to understand the place of philosophy in human history, and particularly in the present age, whose colossal scientific and technological achievements have brought the fundamental philosophical problems very much to the fore.

Quite a few people are inclined to compare the development of philosophical thought through the centuries to a comedy of errors, and not a very amusing one at that. But philosophy, no matter what may be said about it, constitutes one of the most important dimensions of mankind's intellectual progress. The search for a correct world-outlook and the tragic misconceptions, the divergence of philosophical doctrines and their polarisation into mutually

exclusive trends, the conflicts between them which some people regard as a permanent feature of philosophy, all this is not merely the search, the agony and misunderstanding of philosophising individuals. This is the intellectual drama of all mankind, and those who regard it as a farce must also see the tragic as merely the *Idola Theatri*. The antinomies to which philosophy is prey, the crises that shake it to its foundations, the retrograde steps and the repetition of what has been done before, including the misconceptions that have been stubbornly adhered to as truths—are these facts characteristic only of philosophy? Philosophy is the spiritual image of mankind, and its successes and failures comprise the essential content of man's intellectual biography.

The philosophy of Marxism, while rejecting along with mysticism and idealism a contemptuous attitude to scientifically established facts, verities, and laws, naturally rejects the snobbish notion of philosophy's exclusiveness along with philosophical nihilism and mistrust of philosophy in general. Dialectical materialism elaborates the concept of philosophy, proceeding from acknowledgement of the objective necessity of philosophical science and the fact that this necessity is being realised historically.

The development of the philosophy of Marxism—a constant process taking place through the interpretation of scientific discoveries and mankind's historical experience—is also the constant rejection of philosophy that does not seek rational ways of understanding being and cognition that would enable it to work, on equal terms with the other sciences and claiming no special privileges or allowances, for the theoretical investigation and practical remaking of the world. More than a century of fruitful development of Marxist philosophy fully confirms the words of Engels: "It is no longer a philosophy at all, but simply a world-outlook which has to establish its validity and be applied not in a science of sciences standing apart, but in the real sciences. Philosophy is therefore 'sublated' here, that is, 'both overcome and preserved'; overcome as regards its form, and preserved as regards its real content."* The transformation of philosophy into a scientific philosophical world-outlook and its development in this fundamentally new direction is the fulfilment of a tendency that existed embryonically in the first materialist doctrines, a tendency that waxes ever stronger in the process of development of philosophical thought and has assumed a clearly defined pattern since the emergence of Marxism.

* Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 159.

Part Two

DIALECTICS OF BEING AND CONSCIOUSNESS

S. T. MELUKHIN

THE DIALECTICAL-MATERIALIST CONCEPTION OF MATTER

The consistent materialist world-outlook has always postulated that the whole world around us consists of moving matter in its manifold forms, eternal in time, infinite in space, and is in constant law-governed self-development. Nothing in the world exists that is not a certain state of matter, its property, form of motion, a product of its historical development, that is not ultimately conditioned by material causes. Man himself is the most complex of all known material systems. The comprehensive scientific substantiation of these propositions coincided historically with the elaboration of the theory of philosophical materialism, and also with the overcoming of various religious and idealist conceptions of the world. The principle of the world's material unity—the keystone of the dialectical-materialist world-outlook—was substantiated and theoretically developed as a result of the whole historical development of philosophy and natural science, on the basis of the entire social and historical experience of mankind. All the previous progress of science was to a considerable degree bound up with the perfecting of notions of matter, motion, space, time, the laws of structural organisation, and the change and development of various types of material systems of nature and society. The theory of matter and the forms of its existence also holds a key position in the theory of dialectical materialism. The very name of this theory tells us that it is a theory of matter in its manifold forms, matter that moves, develops and is knowable through certain universal dialectical laws. The subjects that dialectical materialism chiefly studies are the universal (attributive) properties, the laws of structural organisation, change and development of various types of material systems of nature and society, and also the systems of man's knowledge of the world and his creative transforming activity. The universal laws of existence that have been discovered then become the universal methodological principles of research. They serve as a means of interpreting newly

discovered facts and laws of science, they become the principles for building new theories, for passing from the known to the unknown, a means of forecasting the paths of further scientific development; they are used for integrating scientific knowledge. The dialectical-materialist doctrine of matter and the forms of its existence reflects the most general essence of the world around us, its most important properties and laws of existence. At the same time the content of this doctrine is of tremendous methodological importance for the further development of scientific theories of matter, motion, space, time, causality, connection, interaction, the theory of evolution, and so on.

The present-day philosophical understanding of matter is a result of the entire previous development of philosophical materialism in its struggle with various religious and idealist systems. We must therefore briefly review the chief stages in the historical formation of the notions of the substantiality of matter, its universal properties and the laws of its existence. An insight into the history of our knowledge of nature helps us to come to grips with the many philosophical problems that have a bearing on contemporary science.

1. THE PROBLEM OF THE SUBSTANCE AND UNITY OF THE WORLD IN PHILOSOPHY

In the history of philosophy the concept of matter arose and developed out of attempts to explain the unity of the phenomena of the surrounding world. It was noted at a very early stage that all objects and phenomena always have certain definite causes and consequences. Nothing could arise from nothing and similarly no object could become nothing but must always pass into certain other bodies. The application of this vital principle, which subsequently became the law of the conservation of matter and motion and the law of causality, led to the idea that there was something stable and enduring at the basis of all objects and phenomena which came to be called the substance, or essence, of things. Whereas various objects and phenomena could appear and disappear, substance could be neither created nor destroyed. It merely changed the forms of its existence, passing from one state into another. It was its own self-cause and the foundation of all change, the lowest and most stable layer of reality. A certain form assumed by substance meant the emergence of a thing with the quality appropriate to that form.

It was in the age when the ideas of the substance and the unity of the surrounding world and the law-governed connection of phenomena arose in men's minds that philosophy took shape as a form of social consciousness.

In the early materialist doctrines of ancient philosophy the rank of substance was accorded to specific material "principles"—water, air, earth and fire, which were believed to be capable of turning into one

another. Aristotle added to these four "elements" a fifth, the quinta essentia or ether, of which he believed all the heavenly bodies, the angels and other celestial beings were composed. This subsequently led to the contrasting of earthly and heavenly substances, which achieved its extreme expression in the dualistic conceptions.

In the philosophy of Anaximander (6th century B.C.) substance was treated as something infinite and indeterminate—the apeiron, eternal in time, inexhaustible in structure and perpetually changing the forms of its existence. Every finite thing was a form of manifestation of the infinite.

The idea of the conservation of substance could not be expressed in concrete form, however. None of the four "elements" of matter possessed the necessary universality and stability, and the idea of the apeiron was too indeterminate and allowed of too many interpretations. These defects were overcome in the atomic theory of substance proposed by Leucippus and Democritus (5th century B. C.) and later developed by Epicurus (3rd century B. C.) and Lucretius (1st century B.C.). This theory postulated the existence of discrete substantial elements, atoms, which could be neither created nor destroyed, which were eternal and differed from one another only in weight, shape, and their distribution in various bodies. The difference in the qualities of bodies was deduced from the difference in the number of atoms, the character of their combinations, velocity and specific types. The universe contained an infinite number of atoms. They were in perpetual motion and their vortices formed the infinite multitude of the Sun-like stars and the various planets. Life itself and the existence of rational beings had come about owing to the law-governed motion and interaction of the atoms.

Atomism was the first theory to enunciate in concrete terms the principle of the conservation of matter, as the principle of the indestructibility of atoms. It was this clarity and concreteness that gave the atomic theory its firm hold in all subsequent materialistic theory. The opposing conceptions that matter was continuous or infinitely divisible afforded no opportunity of expressing the idea of conservation so clearly and concretely. Matter seemed to dissolve and disappear in the mental operation of its infinite division and the potential actual processes of its disintegration. There was nothing for thought to take a grip on and thus assert the idea of conservation and stability.

The atomic theory of matter was revived in the materialist natural philosophy of the 17th and 18th centuries and elaborated in the works of Gassendi, Boyle, Lomonosov, Diderot, Holbach and other thinkers. It formed the main element in the mechanistic view of the world, which was based on the extension of Newton's laws of mechanics to all conceivable phenomena in nature. Newton, who was

in one way or another on our senses”.* The universal properties of matter are motion, connection and interaction, extension, the determinacy of all phenomena, their obedience to necessary and eternal laws, eternity in time and infinity in space. Holbach defended the idea of the material origin of life and the unity of man and nature.

Kant, Fichte, Schelling and Hegel were unable to overthrow the basic propositions of the French materialists’ interpretation of nature, although they did point out some of its weaknesses, arising chiefly from its mechanistic approach. There can be no doubt, however, that French materialism and the mechanistic picture of the world, which dominated natural science in the 18th and 19th centuries, presented a tremendous advance in man’s knowledge of the unity of nature. Of course, they both contain a good many metaphysical propositions and postulates, which was due partly to a lack of scientific facts. The unity of the world was identified with the uniformity and homogeneity of its structure. What was known about the mechanical laws of motion and the physical properties and states of matter was applied to every conceivable scale in space and time. The infinity of space was understood as the unlimited continuity of the stars and astral systems, which were all believed to possess the same observable properties and to obey the law of universal gravitation. Similarly, the development of matter in the universe as a whole was reduced to an infinite continuity of cycles obeying the same immutable laws. The infinite was thus understood as the known, and the finite immeasurably magnified and absolutised.

In such a picture of the world, development was a one-dimensional determined process and all causal connection was identified with necessary connection. Another characteristic feature of the mechanistic picture of the world was reductionism, the reduction of all complex forms of motion to the mechanical motion of the atoms, and the properties of complex systems to the sum-total of the properties of their components. The idea of the simplicity, homogeneity and rigid determinacy of nature offered the possibility of building a self-contained scientific theory of the world that would provide absolute truth in the final instance. The eminent physicist and mathematician of the late 18th and the early 19th century Pierre Laplace wrote: “A mind which could know at any given moment all the forces inspiring nature and the respective positions of all its components, if in addition it were capacious enough to subject all these data to analysis, would be able to embrace the motions of the greatest bodies of the universe and those of the lightest atoms; it would be uncertain of nothing and both the past and the future would be revealed to its eyes.”**

* Holbach, *Système de la Nature, ou des Lois du Monde Physique et du Monde Moral*, London, 1781, p. 28.

** Laplace, *Essai philosophique sur les probabilités*, Paris, 1825, p. 4.

But nature turned out to be far more complex than many of the thinkers of this period imagined. Many of them believed so zealously in the omnipotence of science that they were ready to proclaim: "Give me matter and motion and I will create the world!" But to this such shrewd sceptics as Kant replied, "Here is a large lump of matter and all the possible movements of particles in it. Now try to make even a caterpillar out of that." But it proved to be more difficult to make a caterpillar than the whole world, or rather a mechanistic model of it.

The simplifications and contradictions in the mechanistic picture of the world became more and more apparent in the second half of the 19th century. Previous conceptions of the structure of matter had allowed the existence of primary and structureless substance as the lowest layer of reality, the supporting base and vehicle of its various properties. The atoms were believed to be the elements of such a substance. But the question inevitably arose as to how atoms, situated as they were at definite distances from one another, were connected, and what function the space between them performed. This meant assuming the existence of interatomic electrical, gravitational and magnetic forces that united atoms and other bodies in more general systems. But how were these forces transmitted? The notion that they transmitted themselves, without the mediation of any material substratum and found their ultimate target by some mysterious means led to mystical conclusions such as the existence of motion (forces) without matter, motion in its "pure" form, the idea that these forces possessed infinite velocity of propagation and recognition of the notion of absolute vacuum. The attempt to escape these conclusions produced the hypothesis of the existence of a continuous, all-pervasive ether which filled the space between discrete bodies and carried the connective forces between them. Later the concept of ether was replaced by the concepts of the electromagnetic and gravitational fields as special material systems continuously distributed in space and possessing an infinite number of internal degrees of freedom. Maxwell formulated the equations of the electromagnetic field, which could not be reduced to the equations of classical mechanics. This meant acknowledging the unity of discontinuity and continuity in the structure of matter, the diversity of the forms of its existence and laws of motion.

The turn of the century brought a new series of discoveries; radioactivity, the structural complexity of the atom, electrons, the dependence of the mass of bodies on their velocity, the discovery that the laws of mechanics could not be used to explain the structure of atoms and the motion of electrons, and the idea of the discreteness of energy in the process of radiation. A crisis had arisen in the mechanistic picture of the world and the metaphysical understanding of matter. The idealists, however, and above all the advocates of

empirio-criticism interpreted it as a crisis, or even the total collapse, of materialism as a whole, which they identified with the mechanistic understanding of nature. Dismissing these attacks on materialism, Lenin wrote: "It is, of course, sheer nonsense to say that materialism necessarily professed a 'mechanical', and not an electromagnetic, or some other, immeasurably more complex, picture of the world of *moving matter*." * No other thinker of the day understood as well as Lenin the trends and prospects of development of physical theory. While many scientists, guided by tradition, continued to search for certain primary substantial elements of matter, now identifying them with electrons, Lenin wrote: "The 'essence' of things, or 'substance', is *also* relative; it expresses only the degree of profundity of man's knowledge of objects; and while yesterday the profundity of this knowledge did not go beyond the atom, and today does not go beyond the electron and ether, dialectical materialism insists on the temporary, relative, approximate character of all these *milestones* in the knowledge of nature gained by the progressing science of man. The electron is as *inexhaustible* as the atom, nature is infinite...."*** This proposition implies more than might be suspected at first glance. Besides the idea of the inexhaustibility of the electron and the atom, it also contains a profound thought concerning the relativity of knowledge of the essence and substance of things, of the changing nature of man's notions concerning the character of the substantial elements of matter. The importance of this relativity will be shown later.

Lenin illustrates the principle of the inexhaustibility and infinity of the world in his definition of matter as a philosophical category, "denoting the objective reality which is given to man by his sensations, and which is copied, photographed and reflected by our sensations, while existing independently of them".***

This definition stresses the objectivity of matter in relation to man's consciousness and the knowability of matter, which is closely connected with the dialectical-materialist answer to the basic question of philosophy concerning the relationship between being and consciousness. At the same time this definition embraces the infinite diversity of material objects and systems existing in nature, although as yet only very few of them are known to science.

The idea of the infinity of matter is also basic to the dialectical-materialist theory of knowledge developed by Lenin, which orients science towards unlimited continuity and openness in its theoretical systems, which must reflect objective reality ever more fully and accurately.

* V. I. Lenin, *Collected Works*, Vol. 14, p. 280.

** *Ibid.*, p. 262.

*** *Ibid.*, p. 130.

2. MATTER, ITS BASIC PROPERTIES AND FORMS OF EXISTENCE

The cognition of matter is a multi-stage process and is essentially perpetual. Moreover, at every stage in the development of science the problem of substance is restated in a new way. This concept was radically reshaped by dialectical materialism, which recognises the substantiality of matter, but only in a definite sense, i.e., assuming a materialist answer to the basic question of philosophy, and also the ultimate discovery of the nature of all properties and forms of the motion of matter. It is matter, and not consciousness, not some divine spirit, that forms the substance of all existing properties, connections and forms of motion, the ultimate basis of all spiritual phenomena. No properties or forms of motion can exist by themselves, they are always embodied in definite material formations which make up their substratum. The concept of substance in this sense is equivalent to that of the material substratum of various processes and phenomena. Acknowledging the substantiality and absoluteness of matter is equivalent to acknowledging the principle of the material unity of the world, which is confirmed by the whole historical development of science and practice. But it is important to remember that matter itself exists only in the shape of *concrete* formations and systems, of which the world possesses an infinite variety. Matter does not exist in "general", there is no "matter as such", outside any definite concrete form. The previous general notion was of a structureless primary substance. But in reality no forms of matter can exist without properties and motion. So in the structure of every concrete material system there is no primary and immutable substance on to which properties can somehow be "threaded". Every material object and system possesses an inexhaustible multiplicity of structural connections, the ability to achieve internal changes and transformations into qualitatively different forms. The universal manifests itself not in the form of the existence of a material substance as such, without any properties or forms of motion, but as the presence in the whole multiplicity of material systems of a definite complex of attributive properties and universal laws of existence, the investigation of which constitutes one of the most important tasks of dialectical materialism.

It is sometimes suggested in philosophical literature that dialectical materialism should not investigate matter "as such", on the ontological plane, but should confine itself only to epistemological analysis as the objective source of our knowledge. According to this view, the only stipulation that dialectical materialism should make in respect of matter is recognition of its objective reality in relation to human consciousness, and its fundamental knowability. As for the universal or particular properties and laws of matter, its structure, whether matter is finite or infinite, whether it develops or moves in cycles, this

is said to be exclusively the subject of inquiry of the natural sciences and falls outside the terms of reference of philosophy.

Such a stand, in our view, virtually dismisses the significance of dialectical materialism as a world-outlook, reducing it merely to epistemology, to denial of the objective dialectics of nature, dialectics being acknowledged only in the process of cognition.

An integral dialectical-materialist world-outlook cannot be created without comprehensive and deep-going investigation of the universal properties and laws of existence of matter.

If dialectical materialism is to exert a real constructive, methodological influence on the development of natural science and overcome the various metaphysical and idealist conceptions of matter, it must in addition to recognising the objective reality and knowability of matter reveal, on the basis of a generalisation of the achievements of science and practice, the universal properties and laws of matter's existence. When given theoretical expression, these laws become important methodological principles of the development of knowledge.

Let us take a brief look at these properties. First we must note the absoluteness of matter, its uniqueness as the substantial basis of all phenomena, its uncreatability and indestructibility. Engels pointed out that the unity of the world lies not in its existence (objective existence), but in its materiality, which can be proved not by juggling with a few phrases, but only by the sustained and arduous development of philosophy and natural science. The universality, substantiality and conservation of matter, the determinacy of all phenomena, are proved by all the achievements of science and socio-historical practice. Their reflection in theory produced the law of the conservation of matter and motion, and also the law of causality, which are fundamental principles of materialism. There are no external causes of the existence of matter; it is the cause of itself or, to be more exact, the concept of cause is not applicable to the existence of the material world as a whole. Its chains of cause and effect are infinite in space and time. Every concrete phenomenon is preceded by an infinite multitude of other phenomena and their corresponding connections of cause and effect, and an analogous infinity of phenomena and connections (effects) lies open in the direction of the future. Operating together, the laws of the conservation of matter and its major properties and the law of causality characterise the material unity of the world around us. All forms of idealism and religion arise from arbitrary violations of these laws, from assuming the possibility of creating matter and motion out of nothing or the existence of supernatural phenomena not controlled by the laws of nature or any objective causal connections. On the other hand, the consistent substantiation and proof of these fundamental laws enables us to overthrow various forms of idealism.

The universal philosophical principle of the conservation of matter and motion is spelled out in the specific laws of the conservation of the various properties and states of matter: mass, energy, impulse, electrical charge, spin of elementary particles, isotopic spin, parity (for powerful and electromagnetic interactions), baryon number, strangeness, and so on. Each of these laws of conservation expresses various aspects of stability in the interactions and transformations of elementary particles and also of other bodies.

In the old physics the law of the conservation of matter often used to be identified with the law of the conservation of mass, and mass itself was regarded as a measure of the quantity of matter. The fallacy of these views has now been proved. Mass is only one of the properties of matter, the measure of inertia, gravitational interactions and also internal energy of bodies. Moreover, inert and gravitational masses are exactly equal. The internal energy of a body, corresponding to its rest mass ($E=MC^2$),* is the energy that the photons would possess if all the particles of the given body were transformed into photons, a transformation that requires, of course, a corresponding number of antiparticles. In such annihilation reactions, or the transformation of particles and antiparticles into photons, one form of matter passes into another, i.e., a substance becomes quanta of an electromagnetic field. At the same time the rest mass of the particles of the given substance becomes the motion mass of the photons, and the internal energy ($E=MC^2$) contained in the particles becomes the energy of the photons. It would be wrong to regard all these microprocesses as the transformation of matter and mass into energy, as evidence of the substantial nature of energy. Energy as such, in "pure" form, has never existed. It is only *one of the properties* of material objects, the quantitative measure of motion expressing the internal activity of matter, the ability of material systems to perform certain work by the mutual conversion of forms of motion. Besides energy, all material objects have many other inherent properties that cannot be reduced to energy—mass, spatial dimensions, life-time, impulse, a definite structure, etc. The attempts to substitute the concept of energy for that of matter would therefore appear to be unjustified, since the majority of the properties of material objects—electrical charge, spin of elementary particles, and all the structural features of bodies—cannot be expressed in terms of energy.

The absoluteness, the substantiality and eternal existence of matter also testify to both its objective existence and independence of the consciousness of man and any other intelligent beings that have arisen in the processes of the law-governed development of matter in various

* C is the velocity of light, and E is the energy released when a mass M is completely converted into energy.

parts of the universe. Similarly, all the properties of material objects have objective existence independent of man's consciousness. At this point one must emphasise the fallacy of the long-standing division of the properties or qualities of bodies into primary and secondary. The latter (colour, taste, smell, aesthetic properties) were considered to be dependent on man's consciousness, the peculiar features of his sense organs. This conception ignored the fact that all properties of material objects belong only to themselves. It is only the *sensations* of colour, taste, smell and aesthetic perception that depend on the subject's mental peculiarities. Each of them has objective grounds in the structural features of material bodies.

In philosophical literature one often encounters the division of the properties of knowable phenomena into the material and the ideal. For certain purposes such a division is possible and necessary. All the properties belonging to material objects may be counted as material. Ideal properties are those inherent in the consciousness, individual or social, and also the components of this consciousness—theoretical concepts, images and model representations. These are the properties of properties, and often they manifest themselves as aspects of properties of properties. For example, consciousness is a property of the normally functioning brain of any person involved in social activity and the system of social relations. But consciousness includes a complex of theoretical notions and information images that have their own properties, while these properties have various forms of manifestation, and so on. All these elements in the hierarchy of the properties of consciousness are classed as ideal because they characterise the ideational side of man's life. If we descend this ladder of properties to the lowest material foundations of consciousness, the difference between the material and the ideal at a certain stage becomes relative and disappears. All the abilities and functions of the human brain are determined by the material processes and forms of motion inside the brain. Denial of this fact inevitably leads to dualism, to various conceptions of the mind as some kind of immortal, non-material soul.

The universal attributes of matter include connection, interaction and motion. Connection comprises any form of conditionality, dependence or co-ordination in which alteration of some phenomena is accompanied by the alteration of others.

A particular form of connection is interaction of bodies by means of the exchange of matter and motion and also, in control systems, the exchange of a certain amount of information involving the given matter and motion. Information is any content of the processes of reflection that involves changes in the character of the control in a self-organising system. Outside the sphere of control one can probably speak only of potential information as the content of all processes of reflection, in which the peculiarities of one of the

interacting systems are to a larger or smaller degree reproduced in the peculiarities of the structure and properties of another. The property of reflection occurring in the course of interaction is one of the universal attributes of matter.

Interaction, as a process, is identifiable with motion, which is any process of change occurring in space and time, any transition from one state to another.

Interaction and motion determine all the specific properties of bodies and most of the universal attributes of matter. They also determine the integral organisation of matter, all forms of development, the space-time characteristics of bodies and the peculiar features of their structure. All the specific properties of bodies are the result of their internal and external connections and interactions.

The interaction and motion of matter follows a definable pattern, which means that any phenomenon is always determined by natural laws. This determinacy is one of the most important attributes of matter. Its forms are extremely varied. They include: (1) structural determinacy, or the dependence of properties on their structural relations; (2) conditional determinacy, or the dependence of properties on their stable conditions of existence; (3) causal determinacy, the emergence of phenomena owing to certain causes; (4) the functional mutual determinacy of simultaneously existing properties that are not in causal relations with one another; (5) systemic determinacy, the dependence of properties of bodies on the structural connections of the system of which they are elements (approximate to (2), but not the same thing); (6) genetic determinacy, the dependence of the present and future of a system on its past, and also on previous states (close to causal determinacy (3), but not entirely the same thing).

It is quite possible that other forms of determinacy exist which science has yet to discover. Every objective law implies a definite order or type of connection between elements, a functional relationship expressing the mutual connection between these elements. Depending on the type of the given connection, change in one element evokes a definite change in another element or other elements. The following may be regarded as elements: the properties of one and the same body; properties of different interacting objects; objects in systems and the systems themselves; various stages of change of one and the same object or system; various stages of change or development of different interacting systems; all kinds of sets of elements, any system of properties, processes and relationships. The more complex their content, the more complex the quantitative form of the objective law expressing the structure of the connection between the given systems or their elements.

In theoretical cognition laws are at first stated as functional relations between two or more variable magnitudes. But in principle a phenomenon may depend on a very large number of qualitatively

different variables, the consistent cognition of which involves the movement of thought from essence of a less profound nature to essence that is more profound.

The universal properties of matter also include its organisation as a system, its existence in the form of innumerable different objects and systems, each of which possesses a definite structure. In this sense structure is an attribute of matter in all forms of its existence.

Yet another property of matter is its self-development as the law-governed structural change of all systems, including irreversibility, direction and a host of cyclical changes. Development exhibits itself in manifold forms: (1) as ascending and progressive change; (2) as descending and regressive change; (3) as simple irreversible change on approximately the same level of structural complexity, without significant fluctuations; (4) with considerable repetition and cyclical change at each stage; rigidly determined by its pre-history; (5) with little repetition of previous stages, which diminishes as the structure of the system becomes more complex and the progressive new formations arise; with a determinacy of a probabilistic nature.

The universal forms of existence or attributes of matter also include space and time, the basic properties of which are determined by the structural relations and motion of material systems. Also inherent in matter is infinity in structure, space and time, infinity which is not qualitatively homogeneous and comprises countless qualitatively different levels, stages of development, states and specific laws of change. All objects have an inherent unity of stability and change, continuity and discontinuity in structure and development, a unity of quantitative and qualitative aspects, content and form, possibility and actuality and other opposite aspects. Also of a universal nature are the law of the unity, interaction and conflict of opposites, which is manifest in the structure and development of all systems; the law of the mutual transition of quantitative and qualitative changes; the law of causality; the law of the unity of cyclical, irreversible changes and progress, which is usually associated with the concept of "negation of negation"

Thus the dialectical-materialistic conception of matter is based on fusion of the principles of materialism with all the laws and categories of materialist dialectics. Naturally, of course, all the most important advances and trends in the scientific investigation of the structure and properties of matter must also be taken into consideration.

At this point, however, the question may arise as to how we know that certain properties and laws of matter are really universal and not particular, that is to say, found only in the finite states that we observe. After all, the frontiers of contemporary knowledge lie between 10^{-14} cm to 10^{28} cm (approximately 13,000 million light years), and beyond these limits we have no concrete information about matter and can offer only probabilistic assumptions as to its

properties and laws. May it not turn out that the judgments concerning the world which we today rank as universal actually describe only limited specific states, as was the case with the mechanistic picture of the world?

This possibility can never, of course, be ruled out. In any statement regarding the universal properties and laws of matter there may be propositions that are true only of a limited number of cases but have no universal significance, although today we do not know the limits of their application. Nevertheless, through the consistent identification of the objective content in a summation of relative truths we gradually approach absolute truth, which corresponds to reality and will not be completely rejected in the future, although of course it may be expanded and added to with the development of knowledge.

It is sometimes asked whether there is not a possibility that somewhere in the universe there exists matter without motion, matter which has no structure. Perhaps there is some sphere where there is no such thing as space and time. And so on. For such questions to carry any weight they must have a solid theoretical foundation. Otherwise they differ very little from the traditional religious questions: Is there not somewhere in the universe a god who constantly creates matter out of nothing and governs the universe? Is there not another world beyond this from which no man ever returns? And so on. Although the latter questions were first asked thousands of years ago, and the former comparatively recently, there is no fundamental difference between them when it comes to considering their theoretical grounds.

The process of proving the conclusions of dialectical materialism on the universality of certain properties and laws of matter takes place in stages and includes the following operations. First the proposition with its proofs is tested against all reliably established experimental data and theoretical principles of science. If it contradicts them, it has to be adjusted, particular attention being paid to the weakest spots in the arguments and to the facts that motivate against them. One may cite a million facts indicating the universality of a certain proposition, but its universality will still not be proved because all the infinite number of possible cases cannot be reviewed. On the other hand, it is sufficient to cite one firmly established fact that disproves the proposition for its universality to be refuted.

The *reductio ad absurdum* argument, or indirect proof, involving the creation of a falsifying situation is also widely used. Disproving the opposite provides an argument in favour of the proposition to be proved. This method forms an essential element in the system of the theory of dialectical materialism. It must be based on other principles of the theory and must in its turn substantiate them. It must also have heuristic value, advance the frontier of knowledge, and not be refuted in the light of subsequent development of the theory. The basic

principles and laws of dialectical materialism have as a whole passed this kind of test, although this process cannot in principle ever be complete. But we must always remember that we know by no means all the universal properties and laws of existence of matter; in fact, we probably know only a small fraction of them. After all, matter is infinite, every given system may be an element of a bigger one, any process—a fragment of a greater cycle of change. All these material formations and processes also possess certain integral properties, laws of structural organisation, change and development, which we are unable to understand in all their aspects on the basis of the available data.

The transition to ever larger space-time scales tending towards infinity brings about a qualitative change in the relationship between the general and the particular. Every specific property of matter may appear to us as a universal property of matter. Insofar as such specific properties and laws of matter may exist in infinite numbers, particularly if we consider its structural heterogeneity, its universal properties and laws may also be infinite in number. Any theory describing them will therefore inevitably remain an open and potentially unlimitedly developing system of knowledge. Admittedly, the difficulties incurred in cognition will steadily increase as we pass on to each subsequent structural level in the micro- or mega-worlds, and may at any given stage defeat man's technical capabilities.

3. THE SYSTEMIC ORGANISATION OF MATTER

In the past the concept of matter was often identified with the concept of "corporeal substance" Matter was reduced to the totality of things and the whole objective reality surrounding us was interpreted in three concepts: things, properties and relationships, to which directly or indirectly all other concepts were reduced. Today it is accepted that corporeal substance is only one of the forms of material being, the totality of all material objects possessing finite rest mass. But there also exist insubstantial types of matter which have no rest mass such as the electromagnetic field and its quanta, i.e., photons, the gravitational field, the neutrinos and antineutrinos of various types, which according to data at present available also have no rest mass.

As for the concept of "things", it is too narrow to replace the concept of matter. The tendency to absolutise this concept is a tribute to the old notions that identified matter with bodies, with corporeal substance. In addition, the concept is vague and ambiguous. It would be pointless to describe the galaxy, the metagalaxy, the universe, society, etc., as "things". A more appropriate term is "material systems". Matter implies the infinite diversity of all actually existing

objects and systems endowed with countless universal and particular properties and laws of existence.

All the known forms of matter possess a systemic organisation, which is the result of their law-governed interaction. A system is an internally ordered set of interconnected elements. The connection between the elements in a system is stronger, more essential and intrinsically more necessary than the connection of each of the system's elements with the surrounding environment, with elements of other systems. The internal order of the elements of a system may be either natural or artificial. In the former case it is a complex of objective laws of structural relationships existing outside and independently of man's consciousness. Artificial ordering or systemisation is done by a person constructing a system for certain purposes, for example, for the purposes of production, management, classification of knowledge, and so on. In this case the system, including the character of the interrelations of its elements, is determined by the purpose for which it is created and the necessities of its proper functioning.

Natural material systems are complete and integrated only if they fulfil the following two conditions: (1) there is interaction between their elements by means of exchange of matter and motion (and also information in self-organising, self-controlled systems); (2) there is a unified quantitative law (or set of laws) of interaction of the elements and causal connection between the previous and subsequent states of the system, that is, unified laws of genetic determination.

If these two conditions or criteria are not fulfilled, there can be no integral system; what we have is merely a conglomeration of elements accidentally connected with one another.

In inanimate nature within the space scale from 10^{-14} cm to 10^{28} cm we find the following types of systems: elementary particles and fields, atomic nuclei, atoms, molecules, aggregates of molecules, macroscopic bodies, geological formations, Earth and other planets, the Sun and other stars, local clusters, the galaxy, systems of galaxies, the metagalaxy, the limits and structure of which have not yet been established. This classification is extremely general and approximate, it does not embrace the enormous number of other concrete formations that can exist within the scale indicated (e.g., meteorites, asteroids, diffused nebulae, etc.).

Can it be assumed that the hierarchy of material systems is infinite and the whole universe is an integrated system? There are no grounds for such a conclusion if, of course, we keep to *any* meaningful definition of the term "system", a definition which allows us to indicate its integral nature and distinguish it from a non-system. The point is that the velocity of propagation of any material influences is finite; according to present data, it does not exceed the velocity of light in a vacuum. The life-time of every specific material object and

system is also finite. If the distances between them increase beyond a certain point, objects can no longer interact. The object that has sent the signal will disappear in the time that it takes the signal to reach its target and the reciprocal effect, if it came back, would be received by entirely different forms of matter into which the given object had disintegrated. If there is no interaction between the elements in a system, then the system does not exist as an integral formation. Mental systemising of bodies is not sufficient to create an objectively existing system.

To this must be added the fact that the infinite universe can have no common absolute time, no unified quantitative laws of genetic determinacy, no connection between past and future, which are present in all concrete systems. As for the universal dialectical laws that we know today, they cannot guarantee the systemic nature of the whole universe because these laws operate even when each specific system disintegrates. Besides, it is far from clear whether these laws would operate for an infinite number of homogeneous or heterogeneous systems in the same way as they operate in finite systems and processes. For example, the law of the transformation of quantitative changes into qualitative changes requires a common quality and a common measure; the latter can only be exceeded by a leap signifying transition to a new quality, which also has its specific measure. But the infinite universe has no common quality (or quantity), no common universal measure.

In exactly the same way the law of the negation of negation, of development in spirals demands circularity in a system, and this is impossible for infinite time and an infinite number of objects. The law of the unity, interaction and struggle of opposites operates only if these opposites interact effectively, and interaction, as was shown earlier, depends on the velocity of propagation of material effects, the distances between bodies and the duration of their existence. This is possible only if each of the objects lives at least twice as long as the time taken for the effect to be propagated between them, as expressed in the formula:

$$T_{1,2} \geq 2 \frac{\ell}{c},$$

where $T_{1,2}$ is the life-time of the objects, ℓ —distance, and c —the velocity of light.

In infinity the content of nearly all our concepts and laws undergoes a qualitative change. We are immediately confronted with restrictions on the use of the concept of "system" The infinite universe or all matter may be treated as an infinite number of different interacting objects and systems only insofar as the objective laws of existence permit it to do so. Every system interacts with its near and far environment if its life-time and distance allow this. As for the

so-called mediated or indirect connections, they manifest themselves only up to the point when they fade into mere noises, that is to say, until the transformations of the forms of matter and motion, the diffusion of energy bring about the complete disappearance of the quality of the initial effect. Thus, any sound, electromagnetic or any other signal is bound to fade eventually and no man's shout can shake the whole universe but only the air in his immediate environment. Along with interaction there is also a relative autonomy in the development of systems.

Matter manifests itself not only in the form of inorganic systems, but also in the form of animate and socially organised systems, which we know as yet only by their earthly manifestations. Their appearance is due to the natural and law-governed self-development of matter. Animate matter is the totality of organisms capable of self-reproduction, transmission and accumulation of genetic information in evolution. Socially organised material being is the highest form of development of life, the totality of individuals and their communities which think and consciously transform reality. All these forms of matter also possess systemic organisation. Animate nature gives us the following types of material systems: microorganisms, unicellular organisms, multicellular organisms; systems within organisms—cells and their structural elements, tissues, organs, functional systems (nervous, blood, digestive, breathing, etc.); supra-organism systems—families of organisms, colonies, species, biological communities and biogeocenoses; geographical landscapes and the whole biosphere.

Each of these systems has its own factors of integrity and laws of structural relations, change and development. In this case the energy factors of integrity, which are predominant in the systems of inanimate nature, are no longer determinative. Information processes of self-regulation, control and systems reproduction that ensure their integrity come to the fore.

Society also presents us with numerous types of overlapping systems: man, the family, various kinds of group (for production, study, etc.), communities, associations and organisations, parties, classes, states, systems of states, and mankind as a whole. Social systems are extremely diverse and highly differentiated. They arise on the basis of various connections, human interests and goals, and types of practical activity. The structure of social systems comprises various technical material systems created by man for transforming nature and other purposes. In origin and organisation they depend on man's consciousness insofar as they materialise his knowledge and interests. As the productive forces develop, an ever greater number of elements of external nature will be included in the sphere of man's transforming activity, thus changing the material content of socially organised systems.

All systems have a certain structure and intrinsic organisation. Structure is an inseparable attribute of matter as a whole and all its formations. The internal changes in objects and their integration into greater systems are due to the fact that they have structure. Structureless and totally immutable microobjects could not make up any system, would have no properties whatever and would never reveal their existence.

In modern science the basic types of material systems have given us the corresponding concept of the structural levels of matter. This concept reflects the following attributes of systems: their spatial scales, their types of integrality and laws of structural organisation, and the degree of their relative complexity achieved in the course of matter's historical development. Thus we have the structural level of elementary particles, atomic nuclei, atoms, molecules, macroscopic bodies, geological systems, the planets, solar system, stars, the galaxy, etc. Similarly in animate nature and in society every type of material system has its particular structural level. The point of this classification is primarily to underline the specific nature and qualitative differentiation of the properties and laws of structure, change and development of various types of material systems. Every specific quality is finite and exists within specific limits of measure, in a finite interval of quantitative change. Outside this interval there arises a new quality with its own specific measure. Because of this no particular property of any body can be increased or decreased ad infinitum since at a certain point of quantitative change it passes into a quite different property. Such concepts as infinite mass (or infinitely small mass), infinite charge, density, resilience, etc., are abstract idealisations that never materialise in nature. All these specific properties are finite and, at definite structural levels, may be replaced by other properties. The same applies to the various types of interaction and to laws of quantity which have a definite functional form. This heterogeneity of structures, which stems from the law of the mutual transformation of quantitative and qualitative changes, is to be observed in all known space-time scales and at all stages of the ascending development of matter. It may be assumed that it also exists beyond these limits. The consequence of this fundamental fact is the epistemological principle of the concreteness of truth, the local nature of every specific scientific theory. Its propositions are applicable only in the limited range of space-time scales that do not extend too far beyond the limits of its empirical basis, and they cannot be extrapolated to infinity. Scientific development over the last hundred years specifically confirms this heterogeneity and qualitative diversity of forms of the structural organisation of matter. The laws of the quantum theory and the theory of relativity are qualitatively different from the laws of classical mechanics and cannot be reduced to them; the laws of biological systems in their turn cannot be reduced

to the laws governing the forms of motion of inanimate nature, and in society there have emerged new specific laws of development that are qualitatively different from the laws of all natural phenomena. The properties of any complex system are not equal to the sum-total of the properties of its elements, and these differences also extend to the forms of motion and laws of development inherent in the system. The discovery of this fundamental fact led to a crisis in the various reductionist, mechanistic theories, which reduced all biology to the principles of physics, biologised social phenomena, identified thinking with information processes in cybernetic systems, and so on.

4. THE INFINITY AND UNITY OF MATTER

The materialist theories of the past treated the infinity of matter as its unlimitedness *in* space and time. Space and time were regarded as the external conditions of the existence of matter *in which* it existed and moved. Space stretched endlessly in all directions, constituting a background against which all events took place. In exactly the same way time was treated as endless flux in the course of which everything arose and disappeared and passed from one state into another. In the framework of Newtonian physics such notions led to the conception of absolute space and time, echoes of which are heard even today.

This view implies the division of the universe into three independent realities — matter, space and time. But this division is not tenable if one consistently maintains the principle of the material unity of the world. Only moving matter has real existence, in the form of an infinite multitude of different systems; space and time are not external conditions of being but internal attributes of matter, the forms of its existence. They are objective in relation to consciousness, but not to matter. Space is the form of the existence of matter that expresses its extent and structure, the coexistence and interaction of elements in various material systems. Time is the attribute or form of the existence of matter that characterises the duration of its existence and the sequence of the changes which it undergoes. So instead of the current phrase “matter exists and moves *in* space”, it would be more correct to say that some material objects or systems move in the spatial structures of other material systems (the Earth’s atmosphere, the solar system, the galaxy, the metagalaxy, etc.). Similarly, instead of the phrase “matter exists and develops *in* time”, one should say that time is the duration and sequence of changes in the states of matter. The measure of the duration of this existence of systems is a definite number of cyclical processes in the structure of the subsystems of which they are constituted (molecules, atoms, etc.), or of larger systems (Earth, the solar system, the galaxy). The most convenient unit of time, e.g., year, day, etc., is used to express these cyclical processes.

Human thought has sometimes committed the error of separating space and time from matter and treating them as independent entities. The theory of relativity united space and time in the concept of the space-time continuum, but the latter was regarded by some philosophers as an independent reality which could somehow interact with matter in more or less the same way as systems interact. But any interaction takes place through the exchange of matter and motion and is possible only if the interacting objects exist separately, which is inconceivable in the case of space-time and matter.

Some versions of the unified field theory, the elaboration of which was initiated by Einstein, allow the possibility of reducing matter to the properties of the space-time continuum. A similar view is expressed in John Wheeler's geometrodynamics, which treats the gravitational field as a manifestation of the curve in the space-time continuum. It is regarded as possible to unite the gravitational, electromagnetic and other fields in the concept of a unified field in which elementary particles will be the nodal "points" or quantum effects. This unified field is also treated as a manifestation of the curve in the space-time continuum, thus allowing the possibility of a reduction of all the physics of matter to geometry.

The most valuable thing in the unified field theory and quantum geometrodynamics is the idea of linking matter and space-time relationships, but it is fundamentally impossible to reduce matter to these relationships. The properties of space and time are quite inadequate to express all the multiformity, structural relationships, properties and laws of the existence of matter. What is more, the basic physical problems have not been solved. The attempted merger of gravitation with electrical magnetism has proved to be unsuccessful while the nuclear field does not fit into the "unified" field theory at all. Various types of elementary particles, their properties, interaction and transformation cannot be inferred from the geometrised properties of the space-time continuum nor do various quantum effects related to the discreteness of action follow from the continuity of the space-time continuum while admission of its discreteness creates further difficulties. The above tends to indicate the methodological faultiness of the very conception of the space-time continuum's existing separately from matter, affecting matter and even creating it. Instead, it would be correct to speak of the space-time properties or relationships of matter.

All the properties of space (or rather the spatial properties of matter) are determined by the structural relationships in material systems and should be inferred from these relationships. The properties of time are determined by the sequence and replacement of states of matter, the laws of its development, although they also depend on the structural relations in systems. In the literature the properties of space and time are sometimes subdivided into univer-

sal properties that manifest themselves on all known structural levels, and specific properties that are to be found on only a local scale.

Chief among the universal properties of space are the extension and coexistence of elements. Extension is sometimes identified with space itself, but this is inaccurate because space has other properties besides, such as dimension, connectedness, infinity and metrical properties. Abstract space without extension would exclude any coexistence of elements, their quantitative change, and any structural relationships. This would be the space within a material point, which is merely a mental idealisation. Wherever there are structural relationships and changes of matter there must be extension expressing the coexistence and connectedness of its elements. The connectedness of space, the absence of "gaps" in it, also follows from the universality of matter and motion.

Space (or rather, the spatial properties of matter) has an intrinsic unity of discontinuity and continuity. Discontinuity is extremely relative and manifests itself in the separate existence of material objects and systems, each of which has a certain localisation, dimensions and limits. But matter exists also in the form of various fields—nuclear, electromagnetic, gravitational and so on, which permeate all systems, uniting their elements, and which also exist outside the systems, uniting them in systems or formations of a greater order. The cosmic space of the mega-world is an expression of the extension and structure of material fields and substantial systems such as galaxies and the metagalaxy. The continuity of space is manifest also in the possibility and universality of the continuous spatial movement of bodies and in the existence of the vacuum states of fields. Continuity is an absolute property of matter, while discreteness, discontinuity, is always relative, expressing only the local existence of concrete material objects and their properties.

Metrical relationships expressing the order of connection of spatial elements and the quantitative laws of these connections are closely connected with the extension of space. They are reflected in various types of geometry—Euclidean, non-Euclidean (Lobachevsky's, Riemann's, etc.).

Of the universal properties of time (or to be more exact, the temporal relationships in material systems) the following may be mentioned: duration, irreversibility, asymmetry, non-cyclical character, unity of discontinuity and continuity, concatenation, infinity, and connection with motion, space, structural relations in systems, and infinity (eternity).

These properties of space and time, or to be more exact, the universal aspects of the space-time relationships of matter, are closely connected with other attributes and dialectical laws of the existence of matter and are determined by them.

All the particular, specific space-time properties manifest themselves on a local scale and are inherent in only some states of matter. They, too, are determined by the connections and interconnections of bodies, by the structural relationships in systems and their inherent forms of motion. These properties include the concrete dimensions of bodies, volume, shape, symmetry or asymmetry in the external form or in structure, isotropic or anisotropic nature, metric properties and degree of curvature conditioned by the strength of gravitational potential and the mass of the system.

The specific or particular properties of time include the following: the specific period of existence of systems, the speed and rhythm of change in processes.

The development of the special and general theory of relativity, the physics of elementary particles and other sciences that study space-time relationships in material systems, has revealed specific forms of dependencies of the given properties on motion and the interaction of bodies. Thus, increased velocity causes a relative slowing down of processes within bodies and the dimensions of bodies shrink in the direction of motion. In powerful gravitational fields there is also a relative slowing down of processes, which manifests itself in changes in the frequency of the photons radiated by the given source and in the red shift of spectral lines.

Gravitational fields give rise to the "space curvature", as observed in the facts of the curved trajectory of light rays in gravitational fields. Some writers, it is true, interpret this phenomenon as a literal curvature of space, as the motion of all bodies along certain "grooves" of curved space. This model is unsatisfactory, however, because it turns space into an independent entity determining the motion of matter. Strictly speaking, various bodies move not *in* space as such, but in the spatial structures of larger material systems, and the character of their motion depends on the forces influencing them, that is to say, the structural connections of the above systems.

What proof can be given of the infinity of the material world? Obviously there can be no complete and final proof because of the very nature of the problem and man's limited possibilities at every future stage of the development of science. Nonetheless even today there are arguments which suggest that the idea of infinity is not purely axiomatic or postulatory. The principle of the material unity of the world and the absoluteness and conservation of matter implies the eternity of its existence and an equivalent infinity of time. This infinity has neither beginning nor end, it is an actually existing, that is to say, realised infinity, and at the same time it is a potential infinity, open in the direction of the future unlimited change of matter. It includes the quantitative aspect of unlimited duration, and the qualitative aspect of the "filling up" of this duration with constantly new specific content in the form of the appearance during processes

of material change of qualitatively new states of matter, forms of motion and laws that have not existed before.

In respect of quantity the infinite is a set of elements that has no highest and final element and is made up of components each of which is equivalent to the whole set. This means that the sign of equality may be placed between the elements of the subset and the whole set. An infinite set may include not only a finite number of subsets (each of which in its turn consists of an infinite number of elements), but also an infinite number of subsets, and in the latter case there will be no equivalence between the elements of the subset and the whole set because they are infinities of different orders.

In respect of time, all this means that the general duration of existence of all matter comprises both an infinite set of finite intervals—years, millennia, etc.—and also an infinite set of infinite sequences of change. Thus, time cannot be regarded as uniform and homogeneous, it comprises an infinite set of qualitative transformations of matter. Every relatively independent system possesses its own temporal rhythm of change, sequence of events and laws of development in time. All this diversity of temporal relationships expresses the qualitative infinity of time. The world was not always the same as we see it in the present, and in the future it will undergo continuous qualitative change. Every specific qualitative state of matter is relative and transitory. This is true both of cosmic systems and microobjects. Elements of asymmetry and irreversibility have already been observed in the processes of transformation of microobjects. Thus neutrons, hyperons and certain mesons disintegrate into other elementary particles including neutrinos of different types. The main tendency of these processes is to radiate neutrinos during decay, after which the neutrinos are dispersed in space. But so far no cases have been observed of neutrinos colliding with an electron or positron and producing a mu-meson, or of a mu-meson after interacting with a neutrino producing a pi-meson. The neutrino has a very weak interaction with other particles and the probability of processes resulting in the radiation of neutrinos during the decay of elementary particles is far greater than that of reverse processes of the synthesis of particles due to combination of neutrinos with other microobjects. That is why the number of neutrinos in space should constantly increase.

All this would appear to indicate that the idea of development, of irreversible qualitative change, must in time extend also to elementary particles, which cannot be considered as existing eternally and immutably.

If irreversible changes in matter occur for an infinite period of time, the result must be to produce a countless multitude of qualitative states and forms of the motion of matter. And this is nothing else but structural infinity, if we understand structure in the global sense as

the structure of all matter. Structural infinity cannot be understood in the sense of an unlimited hierarchical sequence of systems in the structure of every microparticle, like a series of Russian dolls fitting inside one another. This would be a purely invented notion. Even today we are encountering the phenomenon of the quite unexpected and unusual structures of elementary particles, which turn out to be different from the structures of all other systems. The collision of high-energy particles may well produce other elementary particles which will increase in number in proportion to the increased energy of the colliding particles. Moreover, each of the generated particles interacts as a single whole in all observable processes. It has not been possible so far to split them into more simple microobjects, in spite of the fact that they are subjected in accelerators and cosmic rays to external influences (by other particles) with thousands of millions of times greater energy than their own, which corresponds to the rest mass of the particle.

This interesting fact suggests the possibility of the existence of microobjects with such tremendous energy in their internal connections that they cannot be split into simpler microobjects by any of the interactions in the metagalaxy, even the processes of gravitational collapse. Such microobjects are compared in the quantum theory of gravitation to scales in the order of 10^{-33} cm, a magnitude arrived at by combining the gravitational constant G with Planck's constant and the velocity of light C : $\sqrt{Gh/c^3} \approx 1.6 \cdot 10^{-33}$ cm.

If such microobjects actually exist, they will be almost equivalent to those primary atoms which Lucretius long ago presupposed in order to explain the eternal cycles of matter. The density of matter for such scales will be $5 \cdot 10^{93}$ g/cm³

This is not to say, of course, that such states of matter will be the final, structureless and immutable substance. On the scale of eternity, in view of the operation of the law of the transformation of quantitative into qualitative changes and a number of other laws of development, they may also become subject to irreversible change and pass into other forms of matter. But on the scale of the universe as a whole and in periods of time in the order of thousands of millions of years, or perhaps far longer periods, they may display a relative stability in all types of interaction, in processes of collapse and the subsequent expansion of cosmic systems. They would be the material substratum that underlies all formations and systems that arise.

Here it is necessary to draw a distinction between the concept of "substance" and "substratum" Substance, in relation to matter as a whole, would signify a primary essence, the lowest and most elementary layer of reality, the basis of all properties and forms of motion. Such substance, as we have noted above, cannot objectively exist. On the other hand, substratum is the totality of microobjects of

the underlying structural plane that condition the properties of the systems on the levels above them and remain stable in all energies of interaction and processes that may be encountered in the given space-time scales. In its application to the states of matter we have been examining this substratum will be relative and finite, mainly because in other spheres of the universe matter will manifest itself in qualitatively different forms, bearing no resemblance to those under consideration, and also because, in the process of the changing of matter in time, it will also change the forms of its structural organisation. In the given case we would emphasise that the idea of structural infinity must be applied to *all matter* in all forms of its existence, but not simply as the unlimited fractioning of a particle into smaller and smaller parts. Structural infinity is rather the consequence of self-development and the qualitative changes of matter in the course of time.

One of the aspects of structural infinity may also be metrical infinity of spatial scales, but this does not, of course, exhaust the whole content of real infinity. The process of its cognition is potentially unlimited and our notions of infinity will always change as science develops. The discovery of its content is sometimes referred to as infinite asymptotic progress of knowledge. But cognition is infinite only in its possibility. In reality, it is always finite. And there are no adequate grounds for assuming its infinity in the future. The limits of the existence of all intelligent beings in the galaxy may be reached in the processes of the gravitational collapse of the metagalaxy and other similar systems, when all complex forms of matter decay and in the process of compression achieve a density of the order of 10^{93} g/cm³, or perhaps much more, after which nature will again, like the Phoenix, arise from its own "ashes" and new cycles of the ascending development of matter begin.

Despite its structural heterogeneity and infinity, matter also possesses a certain unity. Many attempts were made in the past to construct an adequate model of this unity, each of which produced a definite approximation of reality. These models included models of substance-substratum unity, of the structure of the universe out of one and the same substance, of chemical elements, of atoms, or of a primary structureless essence of all things; models of functional unity, of the operation in the universe of universal quantitative laws, the functioning of the universe as a single mechanism in which every atom is constantly linked with every other atom; models of existential unity, reducing it to simple being, to objective existence; and models that treat energy, space and other properties as substance.

All these models have proved faulty. They reduced the unity of the world to the homogeneity and uniformity of its structure, while the infinite was understood as a measurelessly increased and absolutised concrete finite. At present the theory with the best grounding in

scientific facts and practice is the dialectical-materialist theory of the unity of the world, which does not restrict matter to any definite qualitative states or quantitative laws, but assumes the infinity of its forms, given that they all have certain universal properties.

On the global scale the unity of the world manifests itself as follows:

- in the absoluteness, substantiality and eternity of matter and its attributes;

- in the unity of matter and its major properties on all structural levels;

- in the mutual connection and dependence of all material systems and structural levels, in the determinacy of their properties;

- in the various mutual transformations of matter in motion;

- in the historical development of matter, the emergence of ever more complex forms of matter and motion on the basis of less complex forms;

- in the operation of universal dialectical laws of existence manifesting themselves in the structure and development of all material systems.

All these universal aspects of the unity of the world express the objective dialectics of nature. Their reflection in theory produces a statement of the principles of the dialectics of cognition, which help us to pass from the known to the unknown and serve as forms of the integration of growing scientific knowledge.

E. V ILYENKOV

THE CONCEPT OF THE IDEAL

Before discussing the *concept* itself we must first consider the *terms* "ideal" and "ideality", that is to say, we must first define the range of phenomena to which these terms may be applied, without analysing the essence of these phenomena at this point.

Even this is not an easy task because usage in general, and scientific usage in particular, is always something derivative of that very "understanding of the essence of the question" whose exposition our definition is intended to serve. The difficulty is by no means peculiar to the given case. It arises whenever we discuss fairly complex matters regarding which there is no generally accepted interpretation and, consequently, no clear definition of the limits of the object under discussion. In such cases discussion on the point at issue turns into an argument about the "meaning of the term", the limits of a particular designation and, hence, about the formal attributes of phenomena that have to be taken into consideration in a theoretical examination of the essence of the question.

Returning to the subject of the "ideal", it must be acknowledged that the word "ideal" is used today mainly as a synonym for "conceivable", as the name for phenomena that are "immanent in the consciousness", phenomena that are represented, imagined or thought. If we accept this fairly stable connotation, it follows that there is no point in talking about any "ideality" of phenomena existing outside human consciousness. Given this definition, everything that exists "outside the consciousness" and is perceived as existing outside it is a material and only a material object.

At first sight this use of the term seems to be the only reasonable one. But this is only at first sight.

Of course, it would be absurd and quite inadmissible from the standpoint of any type of materialism to talk about anything "ideal"

where no thinking individual (“thinking” in the sense of “mental” or “brain” activity) is involved. “Ideality” is a category inseparably linked with the notion that human culture, human life activity is purposeful and, therefore, includes the activity of the human brain, consciousness and will. This is axiomatic and Marx, when contrasting his position regarding the “ideal” to Hegel’s view, writes that the ideal is “nothing else than the material world reflected by the human mind, and translated into forms of thought” *

It does not follow from this, however, that in the language of modern materialism the term “ideal” equals “existing in the consciousness”, that it is the name reserved for phenomena located in the head, in the brain tissue, where, according to the ideas of modern science, “consciousness” is realised.

In *Capital* Marx defines the *form of value in general* as “purely ideal” not on the grounds that it exists only “in the consciousness”, only in the head of the commodity-owner, but on quite opposite grounds. The price or the money form of value, like any form of value in general, is IDEAL because it is totally distinct from the palpable, corporeal form of commodity in which it is *presented*, we read in the chapter on “Money”.**

In other words, the form of value is IDEAL, although it exists outside human consciousness and independently of it.

This use of the term may perplex the reader who is accustomed to the terminology of popular essays on materialism and the relationship of the material to the “ideal” The ideal that exists outside people’s heads and consciousness, as something completely objective, a reality of a special kind that is independent of their consciousness and will, invisible, impalpable and sensuously imperceptible, may seem to them something that is only “imagined”, something “suprasensuous”

The more sophisticated reader may, perhaps, suspect Marx of an unnecessary flirtation with Hegelian terminology, with the “semantic tradition” associated with the names of Plato, Schelling and Hegel, typical representatives of “objective idealism”, i.e., of a conception according to which the “ideal” exists as a special world of incorporeal entities (“ideas”) that is outside and independent of man. He will be inclined to reproach Marx for an unjustified or “incorrect” use of the term “ideal”, of Hegelian “hypostatisation” of the phenomena of the consciousness and other mortal sins, quite unforgivable in a materialist.

But the question is not so simple as that. It is not a matter of terminology at all. But since terminology plays a most important role

* Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 29.

** *Ibid.*, pp. 98-99.

in science, Marx uses the term “ideal” in a sense that is close to the “Hegelian” interpretation just because it contains far more meaning than does the popular pseudo-materialistic understanding of the ideal as a phenomenon of consciousness, as a purely mental function. The point is that intelligent (dialectical) idealism—the idealism of Plato and Hegel—is far nearer the truth than popular materialism of the superficial and vulgar type (what Lenin called silly materialism). In the Hegelian system, even though in inverted form, the fact of the dialectical transformation of the ideal into the material and vice versa was theoretically expressed, a fact that was never suspected by “silly” materialism, which had got stuck on the crude—undialectical—opposition of “things outside the consciousness” to “things inside the consciousness”, of the “material” to the “ideal”

The “popular” understanding of the ideal cannot imagine what insidious traps the dialectics of these categories has laid for it in the given case.

Marx, on the other hand, who had been through the testing school of Hegelian dialectics, discerned this flaw of the “popular” materialists. His materialism had been enriched by all the achievements of philosophical thought from Kant to Hegel. This explains the fact that in the Hegelian notion of the ideal structure of the universe existing outside the human head and outside the consciousness, he was able to see not simply “idealistic nonsense”, not simply a philosophical version of the religious fairy-tales about God (and this is all that vulgar materialism sees in the Hegelian conception), but an idealistically inverted description of the actual relationship of the “mind to Nature”, of the “ideal to the material”, of “thought to being” This also found its expression in terminology.

We must, therefore, briefly consider the history of the term “ideal” in the development of German classical philosophy from Kant to Hegel, and the moral that the “intelligent” (i.e., dialectical) materialist Marx was able to draw from this history.

It all began when the founder of German classical philosophy, Immanuel Kant, took as his point of departure the “popular” interpretation of the concepts of the “ideal” and the “real” without suspecting what pitfalls he had thus prepared for himself.

It is notable that in his *Critique of Pure Reason* Kant does not formulate his understanding of “ideality”, but uses this term as a ready-made predicate requiring no special explanation when he is defining space and time and speaking of their “transcendental ideality”. This means that “things” possess space-time determinacy only in the consciousness and thanks to the consciousness, but not in themselves, outside and before their appearance in the consciousness. Here “ideality” is clearly understood as a synonym for the “pure” and the a priori nature of *consciousness as such*, with no external connections. Kant attaches no other meaning to the term “ideality”.

On the other hand, the “material” element of cognition is achieved by sensations, which assure us of the *existence* (and only that!) of things *outside consciousness*. Thus, all we know about “things in themselves” is that they “exist”. The ideal is what exists exclusively in the consciousness and thanks to the activity of the consciousness. And conversely, that which exists only in consciousness is characterised as the “ideal”. All clear and simple. A perfectly popular distinction. And what it amounts to is that none of the facts we know and are aware of in things—their colour, geometrical form, taste, causal interdependence—may be attributed to the things themselves. All these are merely attributes provided by our own organisation, and not those of the things. In other words, the “ideal” is everything that we know about the world except the bare fact of its “existence”, its “being outside consciousness”. The latter is non-ideal and, therefore, inaccessible to consciousness and knowledge, transcendental, alien, and awareness of the fact that things, apart from anything else, also “exist” (outside the consciousness) adds nothing whatever to *our knowledge* of them. And it is this interpretation that Kant illustrates with his famous example of the talers. It is one thing, he writes, to have a hundred talers in one’s pocket, and quite another thing to have them only in one’s consciousness, only in imagination, only in dreams (i.e., from the standpoint of popular usage, only “ideal” talers).

In Kant’s philosophy this example plays an extremely important role as one of the arguments against the so-called “ontological proof of the existence of God”. His argument runs as follows. It cannot be inferred from the existence of an object *in the consciousness* that the object exists *outside the consciousness*. God exists in people’s consciousness but it does not follow from this that God exists “in fact”, outside consciousness. After all, there are all kinds of things in people’s consciousness! Centaurs, witches, ghosts, dragons with seven heads....

With this example, however, Kant gets himself into a very difficult position. In fact, in a neighbouring country where the currency was not talers but rubles or francs it would have been simply explained to him that he had in his pocket not “real talers” but only pieces of paper with symbols carrying an obligation only for Prussian subjects.... However, if one acknowledges as “real” only what is authorised by the decrees of the Prussian king and affirmed by his signature and seal, Kant’s example proves what Kant wanted it to prove. If, on the other hand, one has a somewhat wider notion of the “real” and the “ideal”, his example proves just the opposite. Far from refuting, it actually affirms that very “ontological proof” which Kant declared to be a typical example of the erroneous inferring of the existence of a prototype outside the consciousness from the existence of the type in the consciousness.

"The contrary is true. Kant's example might have enforced the ontological proof," wrote Marx, who held a far more radical atheistic position than Kant in relation to "God" And he went on: "Real talers have the same existence that the imagined gods have. Has a real taler any existence except in the imagination, if only in the general or rather common imagination of man? Bring paper money into a country where this use of paper is unknown, and everyone will laugh at your subjective imagination."*

The reproach aimed at Kant does not, of course, derive from a desire to change the meaning of the terms "ideal" and "real" after the Hegelian fashion. Marx bases his argument on realisation of the fact that a philosophical system which denotes as "real" everything that man perceives as a thing existing outside his own consciousness, and "ideal" everything that is not perceived in the form of such a thing, cannot draw critical distinctions between the most fundamental illusions and errors of the human race.

It is quite true that the "real talers" are in no way different from the gods of the primitive religions, from the crude fetishes of the savage who worships (precisely as his "god"!) an absolutely real and actual piece of stone, a bronze idol or any other similar "external object" The savage does not by any means regard the object of his worship as a *symbol* of "God"; for him this object in all its crude sensuously perceptible corporeality *is* God, God himself, and no mere "representation" of him.

The very essence of fetishism is that it attributes to the object in its immediately perceptible form properties that in fact do not belong to it and have nothing in common with its sensuously perceptible external appearance.

When such an object (stone or bronze idol, etc.) ceases to be regarded as "God himself" and acquires the meaning of an "external symbol" of this God, when it is perceived not as the immediate *subject* of the action ascribed to it, but merely as a "symbol" of something else outwardly in no way resembling the symbol, then man's consciousness takes a step forward on the path to understanding the essence of things.

For this reason Kant himself and Hegel, who is completely in agreement with him on this point, consider the Protestant version of Christianity to be a higher stage in the development of the religious consciousness than the archaic Catholicism, which had, indeed, not progressed very far from the primitive fetishism of the idol-worshippers. The very thing that distinguishes the Catholic from the Protestant is that the Catholic tends to take everything depicted in religious paintings and Bible stories *literally*, as an exact representation of events that occurred in "the external world" (God as a

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 1, Moscow, 1975, p. 104.

benevolent old man with a beard and a shining halo round his head, the birth of Eve as the actual conversion of Adam's rib into a human being, etc., etc.). The Protestant, on the other hand, seeing "idolatry" in this interpretation, regards such events as allegories that have an "internal", purely ideal, moral meaning.

The Hegelians did, in fact, reproach Kant for playing into the hands of Catholic idolatry with his example of the talers, for arguing against his own Protestant sympathies and attitudes because the "external talers" (the talers in his pocket) were only symbols in the "general or rather common imagination of man", were only representatives (forms of external expression, embodiment) of the "spirit", just as religious paintings, despite their sensuously perceptible reality, were only images produced by human social self-consciousness, by the human spirit. In their essence they were entirely ideal, although in their existence they were substantial, material and were located, of course, outside the human head, outside the consciousness of the individual, outside individual mental activity with its transcendental mechanisms.

"Gods" and "talers" are phenomena of the same order, Hegel and the Hegelians declared, and by this comparison the problem of the "ideal" and its relationship to the "real", to the materially substantial world was posited in a way quite different from that of Kant. It was associated with the problem of "alienation", with the question of "reification" and "dereification", of man's "re-assimilation" of objects created by himself, objects that through the action of some mysterious processes had been transformed into a world not only of "external" *objective* formations but formations that were also hostile to man.

Hence comes the following interpretation of Kant's problem: "The proofs of the existence of God are either mere *hollow tautologies*. Take for instance the ontological proof. This only means: 'that which I conceive for myself in a real way (*realiter*) is a real concept for me', something that works on me. In this sense *all gods*, the pagan as well as the Christian ones, have possessed a real existence. Did not the ancient Moloch reign? Was not the Delphic Apollo a real power in the life of the Greeks? Kant's critique means nothing in this respect. If somebody imagines that he has a hundred talers, if this concept is not for him an arbitrary, subjective one, if he believes in it, then these hundred imagined talers have for him the same value as a hundred real ones. For instance, he will incur debts on the strength of his imagination, his imagination will *work, in the same way as all humanity has incurred debts on its gods.*"*

When the question was posited in this way the category of the "ideal" acquired quite a different meaning from that given to it by

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 1, Moscow, 1975, p. 104.

Kant, and this was by no means due to some terminological whim of Hegel and the Hegelians. It expressed the obvious fact that social consciousness is not simply the many times repeated individual consciousness (just as the social organism in general is not the many times repeated individual human organism), but is, in fact, a historically formed and historically developing system of "objective notions", forms and patterns of the "objective spirit", of the "collective reason" of *mankind* (or more directly, "the people" with its inimitable spiritual culture), all this being quite independent of individual caprices of consciousness or will. This system comprises all the general moral norms regulating people's daily lives, the legal precepts, the forms of state-political organisation of life, the ritually legitimised patterns of activity in all spheres, the "rules" of life that must be obeyed by all, the strict regulations of the guilds, and so on and so forth, up to and including the grammatical and syntactical structures of speech and language and the logical norms of reasoning.

All these structural forms and patterns of social consciousness unambiguously oppose the individual consciousness and will as a special, internally organised "reality", as the completely "external" forms determining that consciousness and will. It is a fact that every individual must from childhood reckon far more carefully with demands and restrictions than with the immediately perceptible appearance of external "things" and situations or the organic attractions, desires and needs of his individual body.

It is equally obvious that all these externally imposed patterns and forms cannot be identified in the individual consciousness as "innate" patterns. They are all *assimilated* in the course of upbringing and education—that is, in the course of the individual's assimilation of the intellectual culture that is available and that took shape before him, without him and independently of him—as the patterns and forms of *that* culture. These are no "immanent" forms of individual mental activity. They are the forms of the "other", external "subject" that it assimilates.

This is why Hegel sees the main advantage of Plato's teaching in the fact that the question of the relationship of "spirit" to "nature" is for the first time posited not on the narrow basis of the relations of the "individual soul" to "everything else", but on the basis of an investigation of the universal (social-collective) "world of ideas" as opposed to the "world of things". In Plato's doctrine "...the reality of the spirit, insofar as it is opposed to nature, is presented in its highest truth, presented as the organisation of a state" *

Here it must be observed that by the term "state" Plato understood not only the political and legal superstructure, but also the sum-total of social rules regulating the life of individuals within an organised

* G. W. F. Hegel, *Sämtliche Werke*, Bd. 18, Stuttgart, 1928, S. 269.

society, the “polis”, or any similar formation, everything that is now implied by the broader term “culture”

It is from Plato, therefore, that the tradition arises of examining the *world of ideas* (he, in fact, gives us the concept of the “ideal world”) as a stable and internally organised world of laws, rules and patterns controlling the individual’s mental activity, the “individual soul”, as a special, supernatural “objective reality” standing in opposition to every individual and imperatively dictating to the individual how he should act in any given situation. The immediate “external” force determining the conduct of the individual is the “state”, which protects the whole system of spiritual culture, the whole system of rights and obligations of every citizen.

Here, in a semi-mystical, semi-mythological form was clearly established a perfectly real fact, the fact of the dependence of the mental (and not only mental) activity of the individual on the system of culture established before him and completely independently of him, a system in which the “spiritual life” of every individual begins and runs its course.

The question of the relationship of the “ideal” to the “substantially material” was here presented as a question of the relationship of these stable forms (patterns, stereotypes) of culture to the world of “individual things”, which included not only “external things”, but also the physical body of man himself.

As a matter of fact, it was only here that the necessity arose for a clear definition of the category of “ideality” as opposed to the undifferentiated, vague notion of the “psyche” in general, which might equally well be interpreted as a wholly corporeal function of the physically interpreted “soul”, no matter to what organ this function was actually ascribed—heart, liver or brain. Otherwise, “ideality” remains a superfluous and completely unnecessary verbal label for the “psychic” This is what it was before Plato, the term “idea” being used, even by Democritus, to designate a completely substantial form, the geometrical outlines of a “thing”, a body, which was quite physically impressed on man, in the physical body of his eyes. This usage which was characteristic of the early, naive form of materialism cannot, of course, be used by the materialism of today, which takes into consideration all the complexity of the relationships between individual mental activity and the “world of things”

For this reason in the vocabulary of modern materialistic psychology (and not only philosophy) the category of “ideality” or the “ideal” defines not mental activity in general, but only a certain phenomenon connected, of course, with mental activity, but by no means merging with it.

“*Ideality* mainly characterises the idea or image insofar as they, becoming objectivised in words” [entering into the system of socially evolved knowledge which for the individual is something that is giv-

en for him.—E. I.], “in objective reality, thus acquire a relative independence, separating themselves, as it were, from the mental activity of the individual,” writes the Soviet psychologist S. L. Rubinstein.*

Only in this interpretation does the category of “ideality” become a specifically meaningful definition of a certain category of phenomena, establishing the form of the process of reflection of objective reality in mental activity, which is social and human in its origin and essence, in the social-human consciousness, and ceases to be an unnecessary synonym for mental activity in general.

With reference to the quotation from S. L. Rubinstein’s book it need only be observed that the image is objectivised not only in words, and may enter into the system of socially evolved knowledge not only in its verbal expression. The image is objectivised just as well (and even more directly) in sculptural, graphic and plastic forms and in the form of the routine-ritual ways of dealing with things and people, so that it is expressed not only in words, in speech and language, but also in drawings, models and such symbolic objects as coats of arms, banners, dress, utensils, or as *money*, including gold coins and paper money, IOUs, bonds or credit notes.

“Ideality” in general is in the historically formed language of philosophy a characteristic of the *materially established* (objectivised, materialised, reified) *images of human social culture*, that is, the historically formed modes of human social life, which confront the individual possessing consciousness and will as a special “supernatural” objective reality, as a special *object* comparable with material reality and situated on one and the same spatial plane (and hence often identified with it).

For this reason, purely for the sake of terminological accuracy, it is pointless to apply this definition to purely individual mental states at any given moment. The latter, with all their individually unique whims and variations, are determined in effect by the numerous interconnections of the most diverse factors up to and including transient states of the organism and the peculiar features of its biochemical reactions (such as allergy or colour-blindness, for instance), and, therefore, may be considered on the plane of social-human culture as purely accidental.

This is why we find Kant talking about the “ideality of space and time”, but not about the “ideality” of the conscious sensations of weight, for instance, in the muscles of the arm when one is carrying something; about the “ideality” of the chain of cause and effect, but not about the ideality of the fact that a rock with the sun shining on it becomes warmer (although this fact is also consciously perceived). In Kant “ideality” becomes a synonym for the “transcendental charac-

* *Bytie i soznanie (Being and Consciousness)*, Moscow, 1957, p. 41.

ter” of universal forms of sensuousness and reason, that is, patterns of cognitive activity that are inherent in every “self” and thus have a completely impersonal character and display, moreover, a compulsive force in relation to each separate (“empirical”) “self”. This is why space and time, causal dependence and “beauty” are for Kant “ideal”, while they are not mental states connected with the unique and transitory physical states of the individual’s body. Admittedly, as we have seen in the example of the “talers”, Kant does not always adhere strictly to his terminology, although the reason for this is certainly not carelessness (it would be difficult to reproach Kant for that), but rather the dialectical trickiness of the problems that he raises. But despite the instability of the terminological definition of the categories, their objective dialectical content begins to show through—the very content that the Hegelian school provides with a far more adequate definition. The point is that Kant could not fully overcome the notion of “social consciousness” (“universal spirit”) as the many times repeated individual consciousness.

In Hegelian philosophy, however, the problem was stated in a fundamentally different way. The social organism (the “culture” of the given people) is by no means an abstraction expressing the “sameness” that may be discovered in the mentality of every individual, an “abstract” inherent in each individual, the “transcendentally psychological” pattern of individual life activity. The historically built up and developing forms of the “universal spirit” (“the spirit of the people”, the “objective spirit”), although still understood by Hegel as certain stable patterns within whose framework the mental activity of every individual proceeds, are none the less regarded by him not as formal abstractions, not as abstractly universal “attributes” inherent in every individual, taken separately. Hegel (following Rousseau with his distinction between the “general will” and the “universal will”) fully takes into account the obvious fact that in the diverse collisions of differently orientated “individual wills” certain results are born and crystallised which were never contained in any of them separately, and that because of this *social consciousness* as an “entity” is certainly not built up, as of bricks, from the “sameness” to be found in each of its “parts” (individual selves, individual consciousnesses). And this is where we are shown the path to an understanding of the fact that all the patterns which Kant defined as “transcendentally inborn” forms of operation of the individual mentality, as a priori “internal mechanisms” inherent in every mentality, are actually forms of the self-consciousness of *social man assimilated from without* by the individual (originally they opposed him as “external” patterns of the movement of culture independent of his will and consciousness), social man being understood as the historically developing “aggregate of all social relations”.

It is these forms of the organisation of social (collectively realised) human life activity that exist *before, outside and completely independently* of the individual mentality, in one way or another materially established in language, in ritually legitimised customs and rights and, further, as “the organisation of a state” with all its material attributes and organs for the protection of the traditional forms of life that stand in opposition to the individual (the physical body of the individual with his brain, liver, heart, hands and other organs) as an entity organised “in itself and for itself”, as something ideal within which all individual things acquire a different meaning and play a different role from that which they had played “as themselves”, that is, outside this entity. For this reason the “ideal” definition of any thing, or the definition of any thing as a “disappearing” moment in the movement of the “ideal world”, coincides in Hegel with the role and meaning of this thing in social human culture, in the context of socially organised human life activity, and not in the individual consciousness, which is here regarded as something derived from the “universal spirit”

It will readily be appreciated how much broader and more profound such a positing of the question is in comparison with any conception that designates as “ideal” everything that is “in the consciousness of the individual”, and “material” or “real”, everything that is outside the consciousness of the individual, everything that the given individual is *not conscious of*, although this “everything” does exist in reality, and thus draws between the “ideal” and the “real” a fundamentally dividing line which turns them into “different worlds” that have “nothing in common” with each other. It is clear that, given such a metaphysical division and delimitation, the “ideal” and the “material” cannot and must not be regarded as *opposites*. Here they are “different”, and that is all.

Hegel proceeds from the quite obvious fact that for the consciousness of the individual the “real” and even the “crudely material”—certainly not the “ideal”—is at first the whole grandiose *materially established spiritual culture of the human race*, within which and by the assimilation of which this individual awakens to “self-consciousness” It is this that confronts the individual as the thought of preceding generations realised (“reified”, “objectified”, “alienated”) in sensuously perceptible “matter”—in language and visually perceptible images, in books and statues, in wood and bronze, in the form of places of worship and instruments of labour, in the designs of machines and state buildings, in the patterns of scientific and moral systems, and so on. All these objects are in their existence, in their “present being” substantial, “material”, but in their essence, in their origin they are “ideal”, because they “embody” the collective thinking of people, the “universal spirit” of mankind.

In other words, Hegel includes in the concept of the "ideal" everything that another representative of idealism in philosophy (admittedly he never acknowledged himself to be an "idealist")—A. A. Bogdanov—a century later designated as "socially organised experience" with its stable, historically crystallised patterns, standards, stereotypes, and "algorithms". The feature which both Hegel and Bogdanov have in common (as "idealists") is the notion that this world of "socially organised experience" is for the individual the sole "object" which he "assimilates" and "cognises", the sole object with which he has any dealings.

But the world existing before, outside and independently of the consciousness and will *in general* (i.e., not only of the consciousness and will of the *individual* but also of the social consciousness and the socially organised "will"), the world as such, is taken into account by this conception only insofar as it finds expression in universal forms of consciousness and will, insofar as it is already "idealised", already assimilated in "experience", already presented in the patterns and forms of this "experience", already included therein.

By this twist of thought, which characterises idealism in general (whether it is Platonic, Berkeleian, Hegelian or that of Popper), the real material world, existing before, outside and quite independently of "experience" and before being expressed in the forms of this "experience" (including language), is totally removed from the field of vision, and what begins to figure under the designation of the "real world" is an already "idealised" world, a world already assimilated by people, a world already shaped by their activity, the world *as people know it*, as it is presented in the existing forms of their culture. A world already expressed (presented) in the forms of the existing human experience. And this world is declared to be the only world about which anything at all can be said.

This secret of idealism shows up transparently in Hegel's discussion of the "ideality" of natural phenomena, in his presentation of nature as an "ideal" being in itself. Underlying what he has to say about certain natural phenomena is their description in the concepts and terms of the physics of his day: "...because masses push and crush each other and there is no vacuum between them, it is only in this *contact* that the ideality of matter in general begins, and it is interesting to see how this intrinsic character of matter emerges, for in general it is always interesting to see the realisation of a concept."* Here Hegel is really speaking not at all about nature as it is, but about nature as it is presented (described) in the system of a definite physical theory, in the system of its definitions established by its historically formed "language"

* G. W. F. Hegel, *Sämtliche Werke*, Bd. 9, Stuttgart, 1929, S. 101.

It is this fact, incidentally, that explains the persistent survival of such "semantic substitutions"; indeed, when we *are talking* about nature, we are obliged to make use of the available language of natural science, the "language of science" with its established and generally understood "meanings". It is this, specifically, which forms the basis of the arguments of logical positivism, which quite consciously identifies "nature" with the "language" in which people talk and write about nature.

It will be appreciated that the main difficulty and, therefore, the main problem of philosophy is not to distinguish and counterpose everything that is "in the consciousness of the individual" to everything that is outside this individual consciousness (this is hardly ever difficult to do), but to delimit the world of collectively acknowledged notions, that is, the whole socially organised world of intellectual culture with all its stable and materially established universal patterns, and the real world as it exists outside and apart from its expression in these socially legitimised forms of "experience"

It is here and only here that the distinction between the "ideal" and the "real" ("material") acquires a serious scientific meaning because in practice the two are usually confused. Pointing out the fact that the thing and the form of the thing exist outside the individual consciousness and do not depend on individual will still does not solve the problem of their objectivity in its fully materialistic sense. And conversely, by no means all that people do not know, are unaware of, do not perceive as the forms of external things, is invention, the play of the imagination, a notion that exists merely in man's head. It is because of this that the "sensible person", to whose way of thinking Kant appeals with his example of the talers, is more often than other people deluded into taking the collectively acknowledged notions for objective reality, and the objective reality revealed by scientific research for subjective invention existing only in the heads of the "theoreticians" It is the "sensible person", daily observing the sun rising in the East and setting in the West, who protests that the system of Copernicus is an invention that contradicts the "obvious facts" And in exactly the same way the ordinary person, drawn into the orbit of commodity-money relationships, regards money as a perfectly *material* thing, and value, which in fact finds its external expression in money, as a mere abstraction existing only in the heads of the theoreticians, only "*ideally*"

For this reason consistent materialism, faced with this kind of situation, could not define the "ideal" as that which exists in the consciousness of the individual, and the "material" as that which exists outside this consciousness, as the sensuously perceived form of the external thing, as a real corporeal form. The boundary between the two, between the "material" and the "ideal", between the "thing in

itself” and its representation in social consciousness could not pass along this line because, if it did, materialism would be completely helpless when confronted with the dialectics that Hegel had discovered in the relations between the “material” and the “ideal” (particularly, in the phenomena of fetishism of all kinds, from that of religion to that of commodity, and further, the fetishism of words, of language, symbols and signs).

It is a fact that like the icon or the gold coin, any *word* (term or combination of terms) is primarily a “thing” that exists outside the consciousness of the individual, possesses perfectly real bodily properties and is sensuously perceived. According to the old classification accepted by everyone, including Kant, words clearly come under the category of the “material” with just as much justification as stones or flowers, bread or a bottle of wine, the guillotine or the printing press. Surely then, in contrast to these things, what we call the “ideal” is their subjective image in the head of the individual, in the individual consciousness.

But here we are immediately confronted with the trickiness of this distinction, which is fully provided for by the Hegelian school and its conception of the “materialisation”, the “alienation”, the “reification” of universal notions. As a result of this process which takes place “behind the back of the individual consciousness”, the individual is confronted in the form of an “external thing” with people’s general (i.e., collectively acknowledged) *representation*, which has absolutely nothing in common with the sensuously perceived bodily form in which it is “represented”

For example, the name “Peter” is in its sensuously perceived bodily form absolutely unlike the real Peter, the person it designates, or the sensuously represented image of Peter which other people have of him. The relationship is the same between the gold coin and the goods that can be bought with it, goods (commodities), whose universal *representative* is the coin or (later) the banknote. The coin represents *not itself* but “another” in the very sense in which a diplomat represents not his own person but his country, which has authorised him to do so. The same may be said of the word, the verbal symbol or sign, or any combination of such signs and the syntactical pattern of this combination.

This relationship of *representation* is a relationship in which one sensuously perceived thing performs the role or function of representative of quite another thing, and, to be even more precise, the universal nature of that other thing, that is, something “other” which in sensuous, bodily terms is quite unlike it, and it was this relationship that in the Hegelian terminological tradition acquired the title of “ideality”

In *Capital* Marx quite consciously uses the term “ideal” in this formal meaning that it was given by Hegel, and not in the sense in

which it was used by the whole pre-Hegelian tradition, including Kant, although the philosophical-theoretical interpretation of the range of phenomena which in both cases is similarly designated “ideal” is diametrically opposed to its Hegelian interpretation. The meaning of the term “ideal” in Marx and Hegel is the same, but the concepts, i.e., the ways of understanding this “same” meaning are profoundly different. After all, the word “concept” in dialectically interpreted logic is a synonym for *understanding of the essence of the matter*, the essence of phenomena which are only outlined by a given term; it is by no means a synonym for “the meaning of the term”, which may be formally interpreted as the sum-total of “attributes” of the phenomena to which the term is applied.

It was for this reason that Marx, like any genuine theoretician, preferred not to change the historically formed “meanings of terms”, the established nomenclature of phenomena, but, while making strict and rigorous use of it, proposed a quite different *understanding* of these phenomena that was actually the opposite of the traditional understanding.

In *Capital*, when analysing money—that familiar and yet mysterious category of social phenomena—Marx describes as “ideal” nothing more or less than the value-form of the products of labour in general (*die Wertform überhaupt*).

So the reader for whom the term “ideal” is a synonym for the “immanent in the consciousness”, “existing only in the consciousness”, “only in people’s ideas”, only in their “imagination” will misunderstand the idea expressed by Marx because in this case it turns out that even *Capital*—which is nothing else but a *value-form* of the organisation of the productive forces, a form of the functioning of the means of production—also exists only in the consciousness, only in people’s subjective imagination, and “not in reality”

Obviously only a follower of Berkeley could take the point in this way, and certainly not a materialist.

According to Marx, the ideality of the form of value consists not, of course, in the fact that this form represents a mental phenomenon existing only in the brain of the commodity-owner or theoretician, but in the fact that the corporeal palpable form of the thing (for example, a coat) is only a form of expression of quite a different “thing” (linen, as a value) with which it has nothing in common. The value of the linen is *represented*, expressed, “embodied” in the form of a coat, and the form of the coat is the “*ideal or represented form*” of the value of the linen.

“As a use-value, the linen is something palpably different from the coat; as value, it is the same as the coat, and now has the appearance of a coat. Thus the linen acquires a value-form different from its physical form. The fact that it is value, is made manifest by its

equality with the coat, just as the sheep's nature of a Christian is shown in his resemblance to the Lamb of God."*

This is a completely objective relationship, within which the "bodily form of commodity B becomes the value-form of commodity A, or the body of commodity B acts as a mirror to the value of commodity A",** the authorised representative of its "value" nature, of the "substance" which is "embodied" both here and there.

This is why the form of value or value-form is *ideal*, that is to say, it is something quite different from the palpable form of the thing in which it is *represented*, expressed, "embodied", "alienated"

What is this "other", this difference, which is expressed or represented here? People's consciousness? Their will? By no means. On the contrary, both will and consciousness are determined by this objective ideal form, and the thing that it expresses, "represents" is a definite social relationship between people which in their eyes assumes the fantastic form of a relationship between things.

In other words, what is "represented" here *as a thing* is the form of people's activity, the form of life activity which they perform together, which has taken shape "behind the back of consciousness" and is materially established in the form of the relationship between things described above.

This and only this creates the ideality of such a "thing" its sensuous-supersensuous character.

Here ideal form actually does stand in opposition to individual consciousness and individual will as the *form of the external thing* (remember Kant's *talers*) and is necessarily perceived precisely as the form of the external thing, not its palpable form, but as the form of another equally palpable thing that it represents, expresses, embodies, differing, however, from the palpable corporeality of both things and having nothing in common with their sensuously perceptible physical nature. What is embodied and "represented" here is a definite form of labour, a definite form of human objective activity, that is to say, the transformation of nature by social man.

It is here that we find the answer to the riddle of "ideality". Ideality, according to Marx, is nothing else but the form of social human activity represented in the thing. Or, conversely, the form of human activity represented *as a thing*, as an object.

"Ideality" is a kind of stamp impressed on the substance of nature by social human life activity, a form of the functioning of the physical thing in the process of this activity. So all the things involved in the social process acquire a new "form of existence" that is not included in their physical nature and differs from it completely—their ideal form.

* Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 58.

** *Ibid.*, p. 59.

So, there can be no talk of "ideality" where there are no people socially producing and reproducing their material life, that is to say, individuals working collectively and, therefore, necessarily possessing consciousness and will. But this does not mean that the "ideality of things" is a product of their *conscious will*, that it is "immanent in the consciousness" and exists only in the consciousness. Quite the reverse, the individual's consciousness and will are functions of the ideality of things, their comprehended, *conscious ideality*.

Ideality, thus, has a purely social nature and origin. It is the form of a thing, but it is outside this thing, and in the activity of man, as a *form of this activity*. Or conversely, it is the form of a person's activity but outside this person, *as a form of the thing*. Here, then, is the key to the whole mystery that has provided a real basis for all kinds of idealistic constructions and conceptions both of man and of a world beyond man, from Plato to Carnap and Popper. "Ideality" constantly escapes, slips away from the metaphysically single-valued theoretical fixation. As soon as it is fixed as the "form of the thing" it begins to tease the theoretician with its "immateriality", its "functional" character and appears only as a form of "pure activity". On the other hand, as soon as one attempts to fix it "as such", as purified of all the traces of palpable corporeality, it turns out that this attempt is fundamentally doomed to failure, that after such a purification there will be nothing but phantasmal emptiness, an indefinable vacuum.

And indeed, as Hegel understood so well, it is absurd to speak of "activity" that is not realised in anything definite, is not "embodied" in something corporeal, if only in words, speech, language. If such "activity" exists, it cannot be in reality but only in *possibility*, only potentially, and, therefore, not as activity but as its opposite, as *inactivity*, as the absence of activity.

So, according to Hegel, the "spirit", as something ideal, as something opposed to the world of corporeally established forms, cannot "reflect" at all (i.e., become aware of the forms of its own structure) unless it preliminarily opposes "itself to itself", as an "object", a thing that differs from itself.

When speaking of value-form as the ideal form of a thing, Marx by no means accidentally uses the comparison of the mirror: "In a sort of way, it is with man as with commodities. Since he comes into the world neither with a looking glass in his hand, nor as a Fichtean philosopher, to whom 'I am I' is sufficient, man first sees and recognises himself in other men. Peter only establishes his own identity as a man by first comparing himself with Paul as being of like kind. And thereby Paul, just as he stands in his Pauline personality, becomes to Peter the type of the genus homo."*

* Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 59.

Here Marx plainly indicates the parallel between his theory of the “ideality” of the value-form and Hegel’s understanding of “ideality”, which takes into account the dialectics of the emergence of the collective self-awareness of the human race. Yes, Hegel understood the situation far more broadly and profoundly than the “Fichtean philosopher”; he established the fact that “spirit”, before it could examine itself, must shed its unblemished purity and phantasmal nature, and must itself turn *into an object* and in the form of this object oppose itself to itself. At first in the form of the Word, in the form of verbal “embodiment”, and then in the form of instruments of labour, statues, machines, guns, churches, factories, constitutions and states, in the form of the grandiose “inorganic body of man”, in the form of the sensuously perceptible body of civilisation which for him serves only as a glass in which he can examine himself, his “other being”, and know through this examination his own “pure ideality”, understanding himself as “pure activity” Hegel realised full well that ideality as “pure activity” is not directly given and cannot be given “as such”, immediately in all its purity and undisturbed perfection; it can be known only through analysis of its “embodiments”, through its reflection in the glass of palpable reality, in the glass of the system of things (their forms and relationships) created by the activity of “pure spirit” By their fruits ye shall know them — and not otherwise.

The ideal forms of the world are, according to Hegel, forms of activity *realised* in some material. If they are not realised in some palpable material, they remain invisible and unknown for the active spirit itself, the spirit cannot become aware of them. In order to examine them they must be “reified”, that is, turned into the forms and relations of *things*. Only in this case does ideality *exist*, does it possess *present* being; only as a reified and reifiable form of activity, a form of activity that has become and is becoming the form of an object, a palpable thing outside consciousness, and in no case as a transcendental-psychological pattern of consciousness, not as the internal pattern of the “self”, distinguishing itself from itself within itself, as it turned out with the “Fichtean philosopher”

As the internal pattern of the activity of *consciousness*, as a pattern “immanent in the consciousness”, ideality can have only an illusory, only a phantasmal existence. It becomes real only in the course of its reification, objectification (and deobjectification), alienation and the sublation of alienation. How much more reasonable and realistic this interpretation was, compared with that of Kant and Fichte, is self-evident. It embraced the actual dialectics of people’s developing “self-consciousness”, it embraced the actual phases and metamorphoses in whose succession alone the “ideality” of the world exists.

It is for this reason that Marx joins Hegel in respect of terminology, and not Kant or Fichte, who tried to solve the problem of “ideality” (i.e., activity) while remaining “inside consciousness”, without

venturing into the external sensuously perceptible corporeal world, the world of the palpable forms and relations of things.

This Hegelian definition of the term "ideality" took in the whole range of phenomena within which the "ideal", understood as the *corporeally embodied form of the activity of social man*, really exists.

Without an understanding of this circumstance it would be totally impossible to fathom the miracles performed before man's eyes by the COMMODITY, the commodity form of the product, particularly in its money form, in the form of the notorious "real talers", "real rubles", or "real dollars", things which, as soon as we have the slightest theoretical understanding of them, immediately turn out to be not "real" at all, but "ideal" through and through, things whose category quite unambiguously includes *words*, the units of *language*, and many other "things" Things which, while being wholly "material", palpable formations, acquire all their "meaning" (function and role) from "spirit" and even owe to it their specific bodily existence.... Outside spirit and without it there cannot even be *words*, there is merely a vibration of the air.

The mysteriousness of this category of "things", the secret of their "ideality", their sensuous-supersensuous character was first revealed by Marx in the course of his analysis of the commodity (value) form of the product.

Marx characterises the commodity form as an IDEAL form, i.e., as a form that has absolutely nothing in common with the real palpable form of the body in which it is represented (i.e., expressed, materialised, reified, alienated, realised), and by means of which it "exists", possesses "present being"

It is "ideal" because it does not include a single atom of the substance of the body in which it is represented, because it is the form of quite *another body*. And this other body is present here not bodily, materially ("bodily" it is at quite a different point in space), but only once again "ideally", and here there is not a single atom of its substance. Chemical analysis of a gold coin will not reveal a single molecule of boot-polish, and vice versa. Nevertheless, a gold coin represents (expresses) the value of a hundred tins of boot-polish precisely by its weight and gleam. And, of course, this act of representation is performed not in the consciousness of the seller of boot-polish, but outside his consciousness in any "sense" of this word, outside his head, in the space of the market, and without his having even the slightest suspicion of the mysterious nature of the money form and the essence of the price of boot-polish.... Everyone can spend money without knowing what money is.

For this very reason the person who confidently uses his native language to express the most subtle and complex circumstances of life

finds himself in a very difficult position if he takes it into his head to acquire *consciousness* of the relationship between the “sign” and the “meaning”. The consciousness which he may derive from linguistic studies in the present state of the science of linguistics is more likely to place him in the position of the centipede who was unwise enough to ask himself which foot he steps off on. And the whole difficulty which has caused so much bother to philosophy as well lies in the fact that “ideal forms”, like the value-form, the form of thought or syntactical form, have always arisen, taken shape and developed, turned into something objective, completely independent of anyone’s consciousness, in the course of processes that occur not at all in the “head”, but most definitely outside it—although not without its participation.

If things were different, the “idealism” of Plato and Hegel would, indeed, be a most strange aberration, quite unworthy of minds of such calibre and such influence. The *objectivity* of the “ideal form” is no fantasy of Plato’s or Hegel’s, but an indisputable and stubborn fact. A fact that such impressive thinkers as Aristotle, Descartes, Spinoza, Kant, Hegel and Einstein, not to mention thousands of lesser spirits, racked their brains over throughout the centuries.

“Idealism” is not a consequence of some elementary mistake committed by a naive schoolboy who saw a terrible ghost that was not there. Idealism is a completely sober statement of the objectivity of ideal form, that is, the fact of its existence in the space of human culture independently of the will and consciousness of individuals—a statement that was, however, left without an adequate scientific explanation.

This statement of the fact without its scientific materialist explanation is what idealism is. In the given case materialism consists precisely in the scientific explanation of this fact and not in ignoring it. Formally this fact looks just as it was described by the thinkers of the “Platonic line”—a form of movement of physically palpable bodies which is objective despite its obvious incorporeality. An incorporeal form controlling the fate of entirely corporeal forms, determining whether they are to be, or not to be, a form, like some fleshless, and yet all-powerful “soul” of things. A form that preserves itself in the most diverse corporeal embodiments and does not coincide with a single one of them. A form of which it cannot be said WHERE EXACTLY it “exists”

A completely rational, non-mystical understanding of the “ideal” (as the “ideal form” of the real, substantially material world) was evolved in general form by Marx in the course of his constructive critical mastering of the Hegelian conception of ideality, and particularised (as the solution to the question of the form of value) through his criticism of political economy, that is to say, of the classical labour theory of value. The ideality of value-form is a typical

and characteristic case of ideality in general, and Marx's conception of it serves as a concrete illustration of all the advantages of the dialectical materialist view of ideality, of the "ideal".

Value-form is understood in *Capital* precisely as the reified form (represented as, or "representing", the thing, the relationship of things) of social human life activity. Directly it does present itself to us as the "physically palpable" embodiment of *something "other"*, but this "other" cannot be some physically palpable matter.

The only alternative, it appears, is to assume some kind of *bodiless substance*, some kind of "insubstantial substance" And classical philosophy here proposed a logical enough solution: such a strange "substance" can be only *activity*—"pure activity", "pure form-creating activity" But in the sphere of economic activity this substance was, naturally, decoded as *labour*, as man's physical labour transforming the physical body of nature, while "value" became *realised labour*, the "embodied" act of labour.

So it was precisely in political economy that scientific thought made its first decisive step towards discovering the essence of "ideality" Already Smith and Ricardo, men fairly far removed from philosophy, clearly perceived the "substance" of the mysterious value definitions in *labour*.

Value, however, though understood from the standpoint of its "substance", remained a mystery with regard to its "form" The classical theory of value could not explain why this substance expressed itself as it did, and not in some other way. Incidentally, the classical bourgeois tradition was not particularly interested in this question. And Marx clearly demonstrated the reason for its indifference to the subject. At all events, deduction of the form of value from its "substance" remained an insuperable task for bourgeois science. The *ideality* of this form continued to be as mysterious and mystical as ever.

However, since the theoreticians found themselves in direct confrontation with the mysterious—physically impalpable—properties of this form, they had recourse again and again to the well-known ways of interpreting "ideality" Hence, the idea of the existence of "ideal atoms of value", which were highly reminiscent of Leibniz's monads, the immaterial and unextended quanta of "spiritual substance"

Marx, as an economist, was helped by the fact that he knew a lot more about philosophy than Smith and Ricardo.

It was when he saw in the Fichtean-Hegelian conception of *ideality as "pure activity"* an abstractly mystifying description of the real, physically palpable labour of social man, the process of the physical transformation of physical nature performed by man's physical body, that he gained the theoretical key to the riddle of the ideality of value-form.

The value of a thing presented itself as the reified labour of man and, therefore, the *form of value* turned out to be nothing else but the reified *form* of this labour, a form of human life activity.

And the fact that this is by no means *the form of the thing as it is* (i.e., the thing in its natural determinateness) but a *form of social human labour* or of the form-creating activity of social man embodied in the substance of nature — it was this fact that provided the solution to the riddle of *ideality*. The ideal form of a thing is not the form of the thing “in itself”, but a form of social human life activity regarded as *the form of a thing*.

And since in its developed stages human life activity always has a purposeful, i.e., consciously willed character, “ideality” presents itself as a *form of consciousness and will*, as the law guiding man’s consciousness and will, as the objectively compulsory pattern of consciously willed activity. This is why it turns out to be so easy to portray the “ideal” exclusively as a form of consciousness and self-consciousness, exclusively as the “transcendental” pattern of the psyche and the will that realises this pattern.

And if this is so, the Platonic-Hegelian conception of “ideality” begins to appear as merely an impermissible projection of the forms of consciousness and will (forms of thought) on to the “external world” And the “criticism” of Hegel amounts merely to reproaches for his having “ontologised”, “hypostatized” the purely subjective forms of human mental activity. This leads to the quite logical conclusion that all categories of thought (“quantity”, “measure”, “necessity”, “essence”, and so on and so forth) are *only* “ideal”, that is, only transcendental-psychological patterns of the subject’s activity and nothing else.

Marx, of course, had quite a different conception. According to him all the logical categories without exception are only the *idealised* (i.e., converted into forms of human life activity, activity that is primarily external and sensuously objective, and then also “spiritual”), universal forms of existence of objective reality, of the external world. And, certainly, not projections of the forms of the mental world on to the “physical world” A conception, as can easily be seen, which is just the reverse in the sequence of its “theoretical deduction”

This interpretation of “ideality” is in Marx based, above all, on the materialist understanding of the specific nature of the social human relationship to the world (and the fundamental difference between this and the animals’ relationship to the world, the purely biological relationship): “The animal is immediately one with its life activity. It does not distinguish itself from it. It is *its life activity*. Man makes his life activity itself the object of his will and of his consciousness.”*

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 3, Moscow, 1975, p. 276.

This means that the animal's activity is directed *only* towards external objects. The activity of man, on the other hand, is directed *not only* on them, but also on his own forms of life activity. It is activity directed *upon itself*, what German classical philosophy presented as the specific feature of the "spirit", as "reflection", as "self-consciousness"

In the above passage quoted from Marx's *early* works he does not emphasise sufficiently the fundamentally important detail that distinguishes his position from the Fichtean-Hegelian interpretation of "reflection" (the relationship to oneself as to "another"). In view of this the passage may be understood to mean that man acquires a new, second plane of life activity precisely because he possesses *consciousness and will*, which the animal does not possess.

But this is just the opposite of the case. Consciousness and will appear in man only because he already possesses a special plane of life activity that is absent in the animal world—activity directed towards the mastering of forms of life activity that are specifically social, purely social in origin and essence, and, therefore, not biologically encoded in him.

The animal that has just been born is confronted with the external world. The forms of its life activity are inborn along with the morphology of its body and it does not have to perform any special activity in order to "master" them. It needs only to *exercise* the forms of behaviour encoded in it. Development consists only in the development of instincts, congenital reactions to things and situations. The environment *merely corrects* this development.

Man is quite a different matter. The child that has just been born is confronted—outside itself—not only by the external world, but also by a very complex system of culture, which requires of him "modes of behaviour" for which there is genetically (morphologically) "no code" in his body. Here it is not a matter of *adjusting ready-made patterns of behaviour*, but of *assimilating* modes of life activity that do not *bear any relationship at all* to the biologically necessary forms of the reactions of his organism to things and situations.

This applies even to the "behavioural acts" directly connected with the satisfaction of biologically inborn needs: the need for food is biologically encoded in man, but the need to eat it with the help of a plate, knife, fork and spoon, sitting on a chair, at a table, etc., etc., is no more congenital in him than the syntactical forms of the language in which he learns to speak. In relation to the morphology of the human body these are as purely and externally *conventional* as the rules of chess.

These are pure forms of the external (existing outside the individual body) world, forms of the organisation of this world, which he has yet to convert into the forms of his individual life activity, into the patterns and modes of his activity, in order to become a man.

And it is this world of the forms of social human life activity that confronts the newborn child (to be more exact, the biological organism of the species *Homo Sapiens*) as the objectivity to which he is compelled to *adapt* all his “behaviour”, all the functions of his organic body, as the object towards assimilation of which his elders guide all his activity.

The existence of this specifically human object—the world of things created by man for man, and, therefore, things whose forms are *reified forms of human activity* (labour), and certainly not the forms naturally inherent in them—is the condition for the existence of *consciousness and will*. And certainly not the reverse, it is not consciousness and will that are the condition and prerequisite for the existence of this unique object, let alone its “cause”.

The consciousness and will that arise in the mind of the human individual are the direct consequence of the fact that what he is confronted by as the object of his life activity is not nature as such, but nature that has been transformed by the labour of previous generations, shaped by human labour, nature in the forms of human life activity.

Consciousness and will become necessary forms of mental activity only where the individual is compelled to control his own organic body in answer not to the organic (natural) demands of this body but to demands presented from outside, by the “rules” accepted in the society in which he was born. It is only in these conditions that the individual is compelled to distinguish “*himself*” from *his own organic body*. These rules are not passed on to him by birth, through his “genes”, but are imposed upon him from outside, dictated by culture, and not by nature.

It is only here that there appears the *relationship to oneself* as to a single *representative of “another”*, a relationship unknown to the animals. The human individual is obliged to subordinate his own actions to certain “rules” and “patterns” which he has to assimilate *as a special object* in order to make them rules and patterns of the life activity of his own body.

At first they confront him *as an external object*, as the forms and relationships of things created and recreated by human labour. It is by mastering the objects of nature in the forms created and recreated by human labour that the individual becomes for the first time a *man*, becomes a representative of the “human race”, whereas before this he was merely a representative of a biological species.

The existence of this purely social legacy of forms of life activity, that is to say, a legacy of forms that are in no way transmitted through the genes, through the morphology of the organic body, but only through education, only through assimilation of the available culture, only through a process in the course of which the individual’s organic body changes into a representative of the RACE (i.e., the whole

specific aggregate of people connected by the ties of social relationships)—it is only the existence of this specific relationship that brings about consciousness and will as specifically human forms of mental activity.

Consciousness only arises where the individual is compelled to *look at himself as if from the side*—as if with the eyes of *another person*, the eyes of *all other people*—only where he is compelled to correlate his individual actions with the actions of another man, that is to say, only within the framework of collectively performed life activity. Strictly speaking, it is only here that there is any need for WILL, in the sense of the ability to forcibly subordinate one's own inclinations and urges to a certain law, a certain demand dictated not by the individual organics of one's own body, but by the organisation of the "collective body", the collective, that has formed around a certain common task.

It is here and only here that there arises the IDEAL plane of life activity unknown to the animal. Consciousness and will are not the "cause" of the manifestation of this new plane of relationships between the individual and the external world, but only the *mental forms of its expression*, in other words, its *effect*. And, moreover, not an accidental but a necessary form of its manifestation, its expression, its realisation.

We shall go no further in examining consciousness and will (and their relationship to "ideality") because here we begin to enter the special field of psychology. But the problem of "ideality" in its general form is equally significant for psychology, linguistics, and any socio-historical discipline, and naturally goes beyond the bounds of psychology as such and must be regarded independently of purely psychological (or purely politico-economic) details.

Psychology must necessarily proceed from the fact that between the individual consciousness and objective reality there exists the "mediating link" of the historically formed culture, which acts as the prerequisite and condition of individual mental activity. This comprises the economic and legal forms of human relationships, the forms of everyday life and forms of language, and so on. For the individual's mental activity (consciousness and will of the individual) this culture appears immediately as a "system of meanings", which have been "reified" and confront him quite objectively as "non-psychological", extra-psychological reality.*

Hence interpretation of the problem of "ideality" in its purely psychological aspect does not bring us much nearer to a correct understanding of it because the secret of ideality is then sought not where it actually arises: not in space, where the history of the real

* This question is examined in greater detail in A. N. Leontyev's article "Activity and Consciousness" included in this volume.

relationships between social man and nature is enacted, but in the human head, in the material relationships between nerve endings. And this is just as absurd an undertaking as the idea of discovering the form of value by chemical analysis of the gold or banknotes in which this form presents itself to the eye and sense of touch.

The riddle and solution to the problem of "idealism" is to be found in the peculiar features of mental activity of the subject, who cannot distinguish between *two fundamentally different and even opposed categories of phenomena* of which he is sensuously aware as existing outside his brain: the natural properties of things, on the one hand, and those of their properties which they owe not to nature but to the social human labour embodied in these things, on the other.

This is the point where such opposites as crudely naive materialism and no less crudely naive idealism directly merge. That is to say, where the material is directly identified with the ideal and vice versa, where all that exists outside the head, outside mental activity, is regarded as "material" and everything that is "in the head", "in the consciousness," is described as "ideal".

Real, scientific materialism lies not in declaring everything that is outside the brain of the individual to be "primary", in describing this "primary" as "material", and declaring all that is "in the head" to be "secondary" and "ideal". Scientific materialism lies in the ability to distinguish the fundamental borderline in the composition of palpable, sensuously perceptible "things" and "phenomena", to see the difference and opposition between the "material" and the "ideal" *there* and not somewhere else.

The "ideal" plane of reality comprises only that which is *created by labour* both in man himself and in the part of nature in which he lives and acts, that which daily and hourly, ever since man has existed, is produced and reproduced by his own social human — and, therefore, purposeful — transforming activity.

So one cannot speak of the existence of an "ideal plane" in the animal (or in an uncivilised, purely biologically developed "man") without departing from the strictly established philosophical meaning of the term.

Man acquires the "ideal" plane of life activity only through mastering the historically developed forms of social activity, only together with the *social* plane of existence, only together with *culture*. "Ideality" is nothing but an aspect of culture, one of its dimensions, determining factors, properties. In relation to mental activity it is just as much an *objective* component as mountains and trees, the moon and the firmament, as the processes of metabolism in the individual's organic body. This is why people often confuse the "ideal" with the "material", taking the one for the other. This is why idealism is not the fruit of some misapprehension, but the legitimate and natural fruit of a world where things acquire human properties while people are

reduced to the level of a material force, where things are endowed with "spirit", while human beings are utterly deprived of it. The objective reality of "ideal forms" is no mere invention of the idealists, as it seems to the pseudo-materialists who recognise, on one side, the "external world" and on the other, only the "conscious brain" (or "consciousness as a property and function of the brain"). This pseudo-materialism, despite all its good intentions, has both feet firmly planted in the same mystical swamp of fetishism as its opponent—principled idealism. This is also fetishism, only not that of the bronze idol or the "Logos", but a fetishism of a nervous tissue, a fetishism of neurons, axons and DNAs, which in fact possess as little of the "ideal" as any pebble lying on the road. Just as little as the "value" of the diamond that has not yet been discovered, no matter how huge and heavy it might be.

"Ideality" is, indeed, necessarily connected with consciousness and will, but not at all in the way that the old, pre-Marxist materialism describes this connection. It is not ideality that is an "aspect", or "form of manifestation" of the conscious-will sphere but, on the contrary, the conscious-will character of the human mentality is a form of manifestation, an "aspect" or mental manifestation of the *ideal* (i.e., socio-historically generated) *plane of relationships between man and nature*.

Ideality is a characteristic of *things*, not as they are determined by nature but as they are determined by *labour*, the transforming and form-creating activity of social man, his *purposeful*, sensuously objective activity.

The ideal form is the form of a thing created by social human labour. Or, conversely, the form of labour realised in the substance of nature, "embodied" in it, "alienated" in it, "realised" in it and, therefore, presenting itself to man the creator as *the form of a thing* or a relationship between things in which man, his labour, has placed them.

In the process of labour man, while remaining a natural being, transforms both external things and (in doing so) his own "natural" body, shapes natural matter (including the matter of his own nervous system and the brain, which is its centre), converting it into a "means" and "organ" of his purposeful life activity. This is why he looks upon "nature" (matter) from the very first as material in which his aims are "embodied", and as the "means" of their realisation. This is why he *sees* in nature primarily what is suitable for this role, what plays or may play the part of a means towards his ends, in other words, what he has already drawn into the process of his purposeful activity.

Thus, at first he directs his gaze at the stars exclusively as a natural clock, calendar and compass, as *instruments* of his life activity. He observes their "natural" properties and regularities only insofar as they are properties and regularities of the material *in which his activity*

is being performed, and with these “natural” features he must, therefore, reckon as a completely objective *component of his activity* which is in no way dependent on his will and consciousness.

But it is for this very reason that he takes the results of his transforming activity (the forms and relations of things given by himself) as the forms and relations of things as they are. This gives rise to fetishism of every kind and shade, one of the varieties of which was and still is *philosophical idealism*, the doctrine which regards the ideal forms of things (i.e., the forms of human activity embodied in things) as the eternal, primordial and “absolute” forms of the universe, and takes into account all the rest only insofar as this “all the rest”, that is to say, all the actual diversity of the world has already been drawn into the process of labour, already been made the means, instrument and material of realisation of purposeful activity, already been refracted through the grandiose prism of “ideal forms” (forms of human activity), is already presented (*represented*) in these forms, already shaped by them.

For this reason the “ideal” exists *only in man*. Outside man and beyond him there can be nothing “ideal” Man, however, is to be understood not as one individual with a brain, but as a real aggregate of real people collectively realising their specifically human life activity, as the “aggregate of all social relations” arising between people around one common task, around the process of the social production of their life. It is “inside” *man thus understood* that the ideal exists, because “inside” *man thus understood* are *all the things* that “mediate” the individuals that are socially producing their life: *words, books, statues, churches, community centres, television towers*, and (above all!) *the instruments of labour*, from the stone axe and the bone needle to the modern automated factory and the computer. It is in these “things” that the ideal exists as the “subjective”, purposeful form-creating life activity of social man, embodied in the material of nature.

The ideal form is a form of a thing, but a form that is outside the thing, and is to be found in man as a form of his dynamic life activity, as *goals and needs*. Or conversely, it is a form of man’s life activity, but outside man, in the form of the thing he creates. “Ideality” as such exists only in the constant succession and replacement of these two forms of its “external embodiment” and does not coincide with either of them taken separately. It exists only through the unceasing process of the transformation of the *form of activity—into the form of a thing and back—the form of a thing into the form of activity* (of social man, of course).

Try to identify the “ideal” with any one of these two forms of its immediate existence—and it no longer exists. All you have left is the “substantial”, entirely material body and its bodily functioning. The “form of activity” as such turns out to be bodily encoded in the

nervous system, in intricate neuro-dynamic stereotypes and “cerebral mechanisms” by the pattern of the external action of the material human organism, of the individual’s body. And you will discover nothing “ideal” in that body. The form of the thing created by man, taken out of the process of social life activity, out of the process of man-nature metabolism, also turns out to be simply the material form of the thing, the physical shape of an external body and nothing more. A *word*, taken out of the organism of human intercourse, turns out to be nothing more than an acoustic or optical phenomenon. “In itself” it is no more “ideal” than the human brain.

And only in the reciprocating movement of the two opposing “metamorphoses”—forms of activity and forms of things in their dialectically contradictory mutual transformations—DOES THE IDEAL EXIST.

Therefore, it was only DIALECTICAL materialism that was able to solve the problem of the ideality of things.

V A. LEKTORSKY

**THE DIALECTIC OF SUBJECT AND OBJECT
AND SOME PROBLEMS OF THE METHODOLOGY OF SCIENCE**

The philosophy of pre-Marxist materialism evolved a definite understanding of the cognitive process, an understanding which was accepted by the natural sciences and prevailed in the minds of scientists virtually right up to the 20th century. This notion assigns to the cognising subject, the knower, the role of more or less passive receiver of objective information from without. The cognitive process is thus related to a real person and treated as a product of the activity of a material formation, the brain (the philosophical conception being a materialist one). However, the fact that the cognising subject is involved in the structure of reality was not fully realised and his activity in relation to the objects being cognised (particularly his experimental activity) was regarded as something that created only the external conditions for the process of cognition.

This notion ran into trouble as science developed in the 20th century. The revolution which then occurred and is still occurring in various natural sciences, and which is expressed in the breakdown of their conceptual apparatus and revision of their basic propositions, has been accompanied by attempts to rethink the basic philosophical and methodological premises of scientific activity.

Here we shall attempt to outline some of the basic problems of the methodology of modern science to the solution of which the understanding of the dialectic of subject and object evolved by Marxist philosophy is of particular importance. This problem has received increasing attention in recent Soviet philosophical literature.

* * *

A fundamental feature of the Marxist approach to the analysis of cognition is recognition of the need to consider all forms of cognitive activity in the context of the real activity of social man, in the context of the practical transformation of natural and social reality.

It is not in cognition but in practice, i.e., in actually doing something with objective reality, that Marxism sees the starting point of man's relationship with the world. Practice, as social man's changing of the natural and social environment, as the creation of new forms of life activity and hence changing the subject himself, is a specific feature of man and sharply distinguishes him from the animal. Man is not passive in the face of external nature, he treats it as the object of his activity, as something that should be changed in accordance with some aim of his own.

In actual practice cognition of the object as it is "in itself", and goal-setting, the setting of the task of changing the object, are directly united.

It is important to realise, however, that even when cognition does not directly involve material activity and emerges as a specialised form of production—science—its specific features can be correctly understood only if we realise that at all stages of its development cognition depends on activity involving objects, on object activity, on practice. Cognition and practice are not simply two different forms of human activity between which a mere external link may be established, although this is what they may seem on the surface of things. Practice is not only genetically the point of departure of various forms of human life activity; it also essentially determines their functions at each given moment. And if the development of cognition leads to its external isolation from the activity of changing the world, this does not exclude the fact that in the deeper sense science at all stages develops as something dependent on human practice.

Practice is the actual unity of the subject and the object of activity. Moreover, as Marx understood it, the problem of the relationship between the subject and object is not identical to the basic question of philosophy, i.e., the question of the relationship between consciousness and being, because the subject is not simply consciousness, it is a real and acting person, and in its turn the object is not simply objective reality, but that part of it which has become the target of the practical or cognitive activity of the subject. It is important to remember also that the subject of activity and cognition is not simply a separate, "corporeal" individual. A person becomes a subject, doer, knower, only to the extent that he has mastered the modes of activity evolved by society. At the same time even the singling out of the object from objective reality occurs through practical and cognitive activity (logical categories, language, the system of scientific knowledge, etc.) which have been evolved by society and reflect the properties of objective reality. Thus Marx's theory of knowledge is indissolubly linked with his understanding of the nature of man. So it is no accident that the Marxist "practical materialism", which understands man as a transformer of reality and points to the changing of social conditions

by means of revolutionary activity, stands in opposition to the metaphysical, contemplative materialism not only in its social conclusions, but also in its understanding of the fundamental questions of the theory of knowledge.

An object is exposed to the cognising subject from various "angles", in various aspects. But it is the task of scientific knowledge to reproduce the properties of the object "as it is", and not in its relationship to this or that "point of view" of the subject.

The development of knowledge is, in fact, characterised by the tendency to become aware of reality as a "thing in itself", that is, as a single, systemic whole, to connect all the known "fragments" of reality (various systems of relationships) into a unified objective system presenting its various aspects and sides to the cognising subject. It is important to note that the realisation of the above-mentioned tendency in scientific knowledge presupposes that the subject is aware of his place in the system of objective reality. This implies, above all, that the subject must be aware of his object characteristics as a part of the actual cognitive situation, that is to say, the subject must view himself as a natural body forming part of the general objective interconnection and interaction with other bodies and, on the other hand, investigate the results of his own objectified activity, the world of socially significant objects (instruments, tools, linguistic symbols, etc.). Thus it is a necessary condition of the objectivity of knowledge that we should be aware of the object characteristics that have, as it were, "grown together" with the subject either because they are immediately connected with the subject's physical body or, as Marx put it, because they express his "inorganic body", i.e., the world of objects produced by the subject. This means that objectivity of knowledge in the form in which it is established by science presupposes awareness of the part played by the subject's measuring operations, the instruments he uses, his frames of reference, his means of codifying knowledge in one or another system of reference (and the ability to distinguish the code from the content of knowledge). In other words, in developed knowledge (scientific knowledge at any rate) the subject is, as it were, divided; he places himself in a "third position" in relation to himself and the object and attributes this or that subjective "point of view" to a certain "projection" of the object on to the subject, this explanation being given within the framework of the objective system of relationships of reality as a single systemic whole, that is, a "thing in itself"

Thus objective knowledge necessarily presupposes that the subject is aware of his place in the structure of reality because only then is it possible to unite the various aspects of the object (which appear to the subject as various "angles" on the object) and to detect the special features of the "thing in itself". However, the subject's understanding

of his place in the objectively real situation depends on the degree of objectivity of knowledge, on how deeply it has penetrated into the object.

We must emphasise yet another fundamental feature which characterises the Marxist conception of the subject-object dialectic and which strikes us as highly relevant to the problems of the methodology of modern science. The object of activity and cognition is to be understood as a historical phenomenon, that is, an object in which change is dependent on the development of social practice.

It is the practice of the subject which singles out from activity, from objective reality, the object upon which practice is directed (this is why the object is not identical to objective reality because not every object of reality has the function of being an object of practice). The object is cognised in forms of practical activity and this refers even to those objects that man is not immediately concerned with changing. This is expressed in the fact, first, that an object may reveal a functional connection with the object of immediate transformation and therefore acquire a practical interest. Thus the firmament became the object of astronomical observation and cosmogonic study only after knowledge of the positions of the stars revealed their importance for navigation and so on. Secondly, the actual means of contemplation, immediate observation, seeing of reality, that is, the identification of its objective characteristics, background and so on, are mediated by the preceding (individual and social) experience of practical operation with the object.

Changes in the form and character of practice change the object of practice and cognition.

Having understood reflection as *active* reflection, having understood cognitive operations as practical actions that have undergone special change (this idea is being increasingly recognised both in the methodology of science and the modern psychology of thought — suffice it to mention the works of the Swiss psychologist Jean Piaget or the studies by such Soviet psychologists as L. Vygotsky and A. Leontyev and others) Marxist philosophy makes it possible, on the one hand, to show the active role of the subject in the ideal reproduction of the object, the part played in this process by ideal constructions, the devising of patterns, models, abstract objects, etc., and, on the other hand, to understand theory itself as a pattern of potential means of operating with the object. This is not to say that any theoretical operation may be interpreted as a possible form of practical activity because the majority of theoretical operations have no immediate practical significance (their objects — ideal, abstract, etc. — can be presented only in symbolic form). Theory provides possible means of practical activity to the extent to which the ideal operations used in creating it can be linked with direct practical operations, such as operations of experimentation and measurement,

which are particularly important for the theories of natural science and endow theoretical concepts with concrete meaning. These practical operations are a special form of practice, a special way of testing and understanding theoretical scientific hypotheses. For modern works on the methodology of the natural sciences it is axiomatic that the evaluation of theoretical concepts presupposes the establishing of certain empirical dependencies by means of situations reproduced by practical experiment and also by the empirically established results of these situations (this was expressed, although in a distorted, subjectivistic form, by operationalism).

It is a notable fact that this dialectic of subject and object, though characteristic of modern natural science, is not always given an adequate philosophical interpretation by scientists themselves and sometimes leads to subjectivist interpretations.

The subjectivist interpretation of quantum mechanics that some prominent physicists defended in their day is well known.

The prominent German physicist Max Born, opposing such interpretations, emphasised that science should reproduce objective reality existing independently of the consciousness. In Born's view, the key to the concept of reality not only in physics but in any sphere of knowledge is the concept of the invariant of the group of transformations. "Invariants are the concepts of which science speaks in the same way as ordinary language speaks of 'things', and which it provides with names as if they were ordinary things."* Most measurements in physics, Born believed, are not directly concerned with the things but with some kind of projection.

The part played by detection of the invariant characteristics of an object in building up objective knowledge is recognised today by many natural scientists. Jean Piaget, for instance, one of the most eminent psychologists of modern times, places the problem of forming invariants at the centre of his theoretical conception. Piaget sees the essence of intellect in the system of operations derived from objective action. Moreover, action becomes an operation only when it has a certain interconnection with other actions and is organised in a structural whole in which some operations are balanced by other reciprocal operations. The reciprocity of operations means that for every operation there is a symmetrical one that restores the initial position.

It must be noted, however, that attempts to identify the structure of objective knowledge with the identification of invariant characteristics of the object run into serious philosophical difficulties and in Max Born's consideration of the "criterion of reality" the nature of these difficulties becomes particularly apparent. One has the impression that Born is inclined to identify the sum-total of invariants with the

* Max Born, *Physics in My Generation*, London, New York, 1956, p. 163.

reality reproduced in knowledge, and in this connection regards "projections" as something unreal, existing only in relation to physics with its measuring instruments. But the point is that the instruments with which the physicist carries out his experiments act in this respect as quite real physical bodies interacting with other bodies according to objective laws, and so both the results of the interaction and the properties in general arising as a result of the relationship of one object to other objects—the so-called "projections"—must exist in objective reality. What is more, invariance is not an absolute characteristic of one or another property but is revealed only in a particular system of relationships, and what is invariant in one system may be non-invariant in another.

On this basis the critics promptly pointed out the logical vulnerability of the "criterion of reality" proposed by Born. The physical picture of the world includes both invariant and non-invariant magnitudes. Both of them have real meaning and express definite aspects of an object.

Virtually the same difficulties were encountered by the classical philosophical systems, such as Plato's and Kant's, which treated the criterion of invariance as an indicator of the objectivity of knowledge. Kantian philosophy places great emphasis on the subjective character of the sensations in contrast to the objective judgment of reason. In Plato's philosophy the same problem emerges in the form of the impossibility of clearly and logically defining the relationship of the world of constant and immutable ideas to the world of mutable "non-existence" and "becoming" All these difficulties are rooted in the metaphysical, dualistic opposition between immutable objective essences, realities, on the one hand, and the world of subjective variable experience, sensations, "projections" of the thing on the subject, on the other hand.

The conclusion to be drawn from all this would appear to be not denial of the role of the criterion of invariance as an indicator of the objectivity of knowledge (the facts of cognition convince us of its validity), but rather the need to rethink the relationship of the invariant and stable to the non-invariant, the changeable, and also the relationship of the objective to the subjective, which leads to the paradoxes that cannot be solved from metaphysical and idealist positions.

The point is that invariant characteristics themselves can be isolated only through *variability*, through movement, that the invariant necessarily envisages a difference which becomes, as it were, a manifestation of the invariant and a means of its realisation. Moreover, the development of knowledge is characterised by the fact that non-invariant characteristics are explained through the action of invariant characteristics, that is, general, necessary relationships, are included in the system of general necessary dependencies and have

their own objective place in this system. It stands to reason that relationships that are invariant in one frame of reference may be non-invariant in another. At the same time, developed theoretical knowledge is characterised by a search for ways of passing from one system to another which offer the possibility of formulating universal laws. The discovery of a new system in which laws and relationships hitherto considered universal fail to operate stimulates a search for new invariants, etc. It must be stressed that the whole process is carried out on the basis of objective practical interaction between the subject and the object.

The connection noted above between the identifying of invariant characteristics of an object and the objectivity of knowledge, and also the dialectic of the invariant and the non-invariant indicates the inadmissibility of an external, metaphysical dualist counterposing of the subjective and the objective. The subjective and the objective pass into one another; knowledge is subjective not "as it is", but only in relation to another, more accurate, more comprehensive system of knowledge. The development of knowledge is movement from the subjective to the objective, the constant overcoming of subjectivity, the "pouring" of the subjective into the objective (Lenin), the raising of the degree of objectivity of knowledge.

Now we must consider the subjectivist interpretations of the role of objective activity in the theoretical reproduction of the object.

We have already said that the practice of modern science lends increasing conviction to the thesis that evaluation of theoretical concepts presupposes the establishing of certain empirical dependencies between situations that can be reproduced by practical experiment, and also between the empirically established results of these situations. This does not mean, however, that the content of theoretical concepts can be *reduced* to the content of a series of measuring operations. In P. W. Bridgman's operationalism, however, the meaning of theoretical concepts is virtually identified with the content of measuring operations and it is emphasised that various concepts correspond to various sets of operations of this kind. From the standpoint of operationalism it is pointless in science to speak of objective reality independent of the operations of the experimenter.

But the notion of knowledge as a form of purposeful activity by the subject does not override the fact that knowledge is simultaneously the reflection of the object, the ideal reproduction of the reality which exists independently of the consciousness.

If we do not accept the facts that experimental and measuring operations by the subject are, like theoretical operations, determined as regards content by the object, we cannot understand the meaning of these operations themselves. Bridgman's attempt to define the theoretical concepts of physics in terms of experimental operations

entailed the necessity of discovering criteria for generalising various operations (since all operations are bound to differ from one another). Such criteria could not be established operationally in terms of Bridgman's operationalism because he understands operations as something directly given, carrying its content in itself (in approximately the same sense as that of the doctrine of the logical positivists on immediate sense-data). Since any operation depends for its content on the object upon which it is directed, operations with the same external form may have quite different cognitive content. It is the structure of the actual object of cognition which makes us unite different experimental and theoretical operations as operations referring to one and the same object and characterising the meaning of one concept. Despite the formulas of the operationalists, modern science recognises the tremendous significance of theoretical concepts, which make it possible to pass from one set of measuring operations to another, and which reflect the properties of objective reality.

Yet another problem which has increasingly claimed the attention of specialists in the methodology of science is that of the need to take into account the involvement of the scientific theoretical relationship to reality in the wider system of the various means of knowing the world employed by social man. The philosophy of logical positivism, which until recently dominated research on the methodology of science in Western Europe and the United States, proceeded from the fundamental opposition between the philosophical ("metaphysical") and the specialised scientific, cognitive and evaluative relationships to reality, ultimately treating theoretical research as a special means of describing the "immediately given" empirical facts. Today, however, Western writing on the "philosophy of science" gives priority to another school of thought, represented by the work of Thomas Kuhn, Imre Lakatos, Paul Feyerabend and others. This school emphasises the necessary connection between the formulation and discussion of any scientific problem and the acceptance of a definite "paradigm" (Kuhn) or "research programme" (Lakatos), based on various philosophico-"metaphysical" assumptions. But if the connection of the latter with the acceptance of a certain system of value orientations is generally acknowledged, science—according to this way of studying it—cannot be accepted as it is, without taking into account its place in the wider system of culture (Kuhn emphasises close connection of the "paradigm" with the system of social and cultural institutions). And besides, in itself the scientific theoretical relationship to the world expresses a certain value orientation (Feyerabend particularly stresses this point). Finally, if a theoretical construction is not simply an "abridged description" of facts or outline of the transition from some facts to others, if the very description of the empirical data presupposes evaluation and interpretation through the

prism of theoretical propositions, the gap between evaluatory statements and statements of facts turns out to be not very great.

At any rate, according to these notions science not only as a social institution but also as a system of means of obtaining knowledge (i.e., analysed in its methodological aspect) would appear to be closely involved in the wider context of various human relationships to the world and cannot be fully understood without taking the latter into consideration.

As Feyerabend emphasises (quoting Marx), it is necessary to take into account the essentially human character of science, its involvement in the system of activity. The most rigorous standards of research, he continues, are not imposed on science "from without", but are inseparably linked with the creative essence of the cognitive process.

At the same time it must be noted that as a whole the representatives of this trend in the "philosophy of science" offer not so much acceptable solutions as an uncompromising statement of some of the questions involved in the philosophical-methodological study of science.

But the approaches recommended by this school, the dependencies which they consider fundamental (historical analysis of knowledge, connection between philosophical and specialised scientific thought, unity of empirical description and theoretical interpretation, etc.), and which are regarded in contemporary British and American literature as a radically new orientation of the "philosophy of science" in a fundamentally different philosophical and scientific context, all these dependencies characterise the Marxist analysis of knowledge, admittedly (and this is of fundamental importance!) in an essentially different philosophical and scientific context. Awareness of the fact that scientific knowledge is involved in the system of social relationships, in the context of the various means by which social man comprehends the world, is one of the fundamental features of the Marxist tradition in the study of knowledge, and within the framework of this tradition substantial scientific results have been obtained.

It is not debatable that science cannot exist without man. And when the logical positivists maintained that the task of the "philosophy of science" amounted to the analysis of the logical language of ready-made theoretical systems, they realised full well, of course, that theoretical systems and their language do not exist outside human activity. The whole point is how man, the subject, is included in the subject-matter of the methodology of science. In recent years Karl Popper has been propagating the idea of "epistemology without the subject". The essence of this conception is not so much the elimination of the subject from epistemological, methodological analysis (after all, recognition of a "cognitive subject" does not

contradict the basis of this point of view), as the treatment of the content of logical and methodological norms as irrelevant to the subject's creative cognitive activity and imposed on him, as it were, from without.

Marxist philosophy, while emphasising the objective character of scientific knowledge, its reflection of an objective reality existing independently of the subject, nevertheless maintains as a necessary condition for the acquisition of genuinely objective scientific knowledge that the place of the subject as a real being in the production of knowledge must be taken into account. Scientific knowledge is not only genetically conditioned by the practical-object relationship of man to the world, but also functions continuously in the broad system of practical-value orientations.

Essential to the Marxist understanding of the categories of materialist dialectics as the methodological apparatus of scientific knowledge is the historical approach to the analysis of knowledge, awareness that the dialectically interpreted history of the subject-object relationship brings about changes not only in knowledge, but also in its logical structure. The development of science goes hand in hand with the transformation of its logical structure, which is expressed, on the one side, in the changes that take place in the relationship between the theoretical and empirical levels of knowledge, the role of models and mathematical formalisms, and, on the other, in the changes affecting the categorial structure of scientific thought. Thus, for example, the revolutionary shift currently experienced by science (an essential component of the scientific and technological revolution) finds specific expression in the promotion of those categories of scientific thought which were "in the shade" during the period of classical natural science (object-relationship, system-element, subject-object, and so on). This shift is also expressed in a change in the logical relationships between the categories functioning in cognition (often described as the new "style" of natural scientific thought).

Of great importance in this context is Lenin's idea that the Marxist theory of knowledge and dialectics should be built up from such fields of knowledge as the history of philosophy, the history of knowledge in general, the history of the specialised sciences, the history of the mental development of the child, and of animals, the history of language, the psychology and physiology of the sense organs.*

"Continuation of the work of Hegel and Marx," Lenin wrote, "must consist in the *dialectical* elaboration of the history of human thought, science and technique."** Materialist dialectics as the methodology of cognition points to the wealth of the historical

* See V. I. Lenin, *Collected Works*, Vol. 38, pp. 352-53.

** *Ibid.*, pp. 146-47.

experience of mankind's cognitive activity and emphasises the relative, limited character of any "closed" logico-methodological system.

The categories of Marxist dialectics are not just a set of rigid devices that never change. These categories do change and are enriched as science and social practice develop. So the Marxist methodological analysis of science cannot be reduced to the application of a set of cut-and-dried categories or to the analysis of this or that ossified scientific theory. It presupposes an essentially historical approach both to science and to philosophy. At the same time the full realisation of the broad programme proposed by Lenin for the study of the history of knowledge is a task that has yet to be accomplished by the Marxists of today.

* * *

We must now consider yet another aspect of the dialectic of subject and object, an aspect which has particular significance when one is discussing the methodological problems of the sciences concerning man. We have already stated that the production of objective knowledge presupposes not simply the subject's passive assimilation of content that is externally given; it implies purposeful activity on the part of the subject, activity which also includes a certain degree of self-reflection, that is to say, the subject's awareness both of his place in the objective world, and also of the character of his activity in relation to objects. Now we must emphasise another fundamental element of Marxist philosophy: the subject can know himself only insofar as he clarifies his place in objective reality, insofar as he relates himself and his world—the world of his mind, an ideal world—with the world of real objects, natural bodies, on the one hand, and, on the other, the socially significant objects created by mankind (instruments of labour and other products of human activity comprising socially-tested means of operation, language symbols, etc.).

Only by knowing the objective world and establishing the results of his cognition in an objectified form can the subject arrive at himself, at the world of his consciousness, at the psychological and the ideal. There is no other way for the subject to know himself.

Thus not only is the object not given immediately for the subject; it has to be reproduced by the activity of the subject more and more accurately in knowledge. Nor is the subject himself given immediately in relation to himself (in contrast to the views held by Descartes and Husserl). At the same time the subject does not stand "beyond" his activity as a kind of mysterious "thing in itself", whose manifestation in the world of phenomena has nothing in common with its essence (Kant and Schopenhauer). The subject removed from his activity in

objectivising, transforming and ideally reproducing the objective world is empty, meaningless and simply does not exist as a historical subject. "Neither nature objectively nor nature subjectively is directly given in a form adequate to the *human* being,"* wrote Karl Marx. Man's experiencing of himself as "ego" presupposes his learning the forms of human intercourse (in relation to any given individual they appear to be an objective force) and the possibility, to a certain degree, of regarding himself from the position of "another person", the generalised representative of society, a social class or group.

Man cognises himself by cognising the forms of social life activity created by mankind. Moreover, the process of self-knowledge is endless because his cognition of these forms is accompanied by constant creation of new forms. Thus the point is not that the subject as a ready-made, definite object in himself is simply infinitely complex in his internal connections and mediacies, but that the subject is not ready-made at all; on the contrary, he emerges as something which is not equal to himself, as a continuous "outlet" beyond his own limits. Moreover, any act of cognition of the object forms created by mankind turns out to be connected with the subject's rethinking of himself, with his setting new tasks and creating new forms of activity. It is this fact that is reflected in the Marxist conception of practice as the global historical process of the object-transforming activity of the subject in the Marxist understanding of man not as a passive product of externally given objective conditions, but as the creator of his own history in accordance with the objective laws of historical development. Hence the thesis of the subject's socio-historical nature which is of such importance in Marxism.

Also fundamental to Marxism is the thesis that the subject of practice and knowledge is not an "epistemological Robinson", but a vehicle of sociality, "the ensemble of the social relations" (Marx). Since the subject's being socially conditioned implies his membership of a social group, particularly some class or other, this is bound to have an effect on the character of both practice and knowledge. In class society there can be no single "universal human" practice. There is only the practice of different, often opposed social classes and, above all, such classes as the proletariat and the bourgeoisie. This fact has a very substantial effect on the character of cognition by subjects involved in various types of social activity.

It is beyond the scope of this article to consider in detail the methodological problems connected with the subject's cognition and such specific forms of his life activity as the consciousness, mentality and the ideal. We can only refer to the fruitful work being done in

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 3, Moscow, 1975, p. 337.

contemporary psychology on the problem of the ideal as realisation of the Marxist philosophical thesis that the subject should be understood not as a special "purely spiritual" thing standing alongside the world of objective things, but primarily as the socially conditioned subject of practical activity. We have in mind above all the works of the Soviet psychologists L. Vygotsky and A. Leontyev.*

In these studies the notion of the ideal is realised not simply as passive contemplation of certain ideal essences distinct from real physical objects, but as a special form of activity, an activity whose operations stem from practical activity in transforming real objects, although it is not directly concerned with them but with objects that represent other real objects (language symbols, the drawings and symbols used in knowledge, the canvas and paints in painting, the marble in sculpture). The ideal object is distinguished from the real not by the fact that it exists somewhere in another world (the ideal can be established only insofar as it is embodied in material, sensuously perceptible objects), but by the fact that the ideal object represents another object, i.e., "speaks" not about itself but about this other object. Thus the ideal is a special kind of activity embodied in an externally sensuous form. This does not rule out the fact that certain moments of ideal activity may subsequently become "involved", that is to say, the subject may cease to be aware of them and the ideal may thus become "interiorised", in which case the ideal presents itself to the subject as direct contemplation of an externally given object and appears to be a kind of essence existing in some special ideal world.

At the same time we must not forget the distinction between ideal and practical activity. The distinction lies in the fact that ideal activity takes part as a necessary component in human life activity as a whole only to the extent that it succeeds in one form or another (as a rule, in a rather complex and mediated form) in finding a way to practical activity. The product of practice has value for man in itself. The ideal object as a product of ideal activity is valuable not in itself, not in its "corporeal", objectified nature, but only as related to another object, as a representative of reality. In other words, practice changes reality, while ideal activity is the reflection of reality.

This article has dealt with only some fundamental elements of the relationship between the Marxist understanding of the subject-object dialectic and contemporary problems of the methodology of science. The whole great complex of these problems demands comprehensive and detailed working out from Marxist positions.

* See the article by A. N. Leontyev in the present volume.

A. P. SHEPTULIN

A CONTRIBUTION TO THE QUESTION OF THE CATEGORIES OF MATERIALIST DIALECTICS

In the course of the development of knowledge based on practice man discovers more and more new properties and relationships inherent in the reality by which he is surrounded. He penetrates ever deeper into the world of phenomena and begins to detect, single out and express in the form of concepts those properties and relationships, such as motion, space, time, causality, regularity, necessity, chance and contradiction, that are universal and belong to all material entities, all phenomena of the external world. These universal properties and relationships are inseparable characteristics of material entities, they are attributes of matter, the universal forms of its existence, and the concepts that express them and take shape in the process of man's creative activity are philosophical categories. The latter are thus the universal forms of people's mental activity, the ideal images reflecting the properties and relationships inherent in all phenomena of reality. Through them we come to understand the specific material that we gather in the process of scientific research and the practical transformation of reality; through them we abstract the most essential characteristics of the object that interests us. For instance, if we view an object through the prism of the categories of the general and the particular, we are able to establish the identity and difference that exist between it and other objects; using the categories of "causality" and "necessity" we are able to trace its causes and its necessary and accidental properties and relationships; analysis by means of the categories of quality, and quantity helps us to detect its qualitative and quantitative characteristics and, under certain circumstances, the connections between them, and so on.

1. THE NATURE OF PHILOSOPHICAL CATEGORIES

Definition of the nature of philosophical categories, their place and role in the development of knowledge, is directly connected with the solution of the problem of the interconnection between the individual

and the general in objective reality and in consciousness, with discovering the origin of the ideal essences and how they are related to the material entities and phenomena of objective reality.

This problem was clearly posed by the philosophers of Ancient Greece and a definite solution to it was furnished by the Pythagoreans, who, having studied the quantitative aspect of things and discovered its connection with number, came to the conclusion that number was a universal ideal essence existing outside and independently of separate, individual things and determining their existence.

The Pythagorean view was further developed by Plato, who held that independently existing ideal essences were the true reality as distinct from the individual things which they generated.

This view of the nature of categories was opposed by Aristotle. He maintained that the content of the categories that could be regarded as general concepts did not exist before individual things, but was the result of knowing them, of the reflection of their inherent properties and relationships. When we perceive individual things, Aristotle maintains, we come to know not only the individual but also the general, which is repeatedly observed in a series of objects or in all of them. In the process of our numerous perceptions of things the general, the inherent, crystallises in our consciousness and is expressed in the form of a general concept, which exists alongside the individual images. When the first general concept has taken root in the mind, even more general concepts reflecting the properties and relationships of an even wider range of things grow up on its basis, these being followed by the most general concepts, the so-called categories, reflecting the universal forms of being.*

Aristotle's theory of the nature of categories, although essentially correct, is not entirely consistent. In asserting that the material and form inherent in every individual thing are the analogue of the content of general concepts in objective reality, Aristotle treated form as ideal and capable of existing independently of material things. And this means that not all of that which is general, inherent in the external world, is material and exists only through individual things. Part of the general is ideal, existing outside and independently of sensuous things. This was a notable concession to Plato, and to the idealist approach to the problem.

In medieval times the understanding of the categories, like other solutions to philosophical problems, was coloured by theology. Philosophers of the realist school recounted in one form or another Plato's view of the categories as independent ideal essences. The nominalists rejected this interpretation and denied the categories any

* Aristotle, *Posterior Analytics*, Book 2, Ch. 19. In *The Works of Aristotle*, Chicago, London, 1952, pp. 136-37.

independent existence in objective reality or in the mind. The philosophers of the new age (Bacon, Hobbes, Locke and others) rejected the realist conception of the nature of categories and developed Aristotle's treatment of them as reflections of the universal properties and qualities of individual things. The French materialists of the 18th century (Diderot, Holbach, Helvetius and others) furnished a similar solution to the problem.

A different view of the nature of the categories was presented by Kant. He held that categories are not the reflection of any aspects or connections of objective reality, but are forms of the innate activity of the mind. Their content is determined by the mind, is one of its characteristic features and is brought into the world of phenomena by the subject in the process of his cognitive activity, which occurs thanks to the fact that he (the subject) already has these categories in his mind.

Kant's argument has a strong rational appeal if we take the individual as the subject of cognition, the knower. In relation to any individual the categories are forms of mental activity that exist in his mind before the performance of any act of cognition. Only when he has mastered the categories can the individual think and thus know the surrounding reality. As far as he is concerned the categories exist a priori before any attempt at cognition on his part. But the real subject of cognition, the knower, is not the individual but society, and in relation to society the categories are not something preceding cognition, not a priori forms of mental activity, but forms of the reflection of reality acquired in the process of practical activity and the development of cognition on its basis. Their content is determined not by consciousness but by objective reality, is not a characteristic feature of consciousness but the reflection of the characteristics of universal forms of existence. It is not subjective, not introduced into the world of phenomena by the subject, but is inferred by him from objective reality and expressed in an ideal form.

The subjectivism of the Kantian explanation of the nature of the categories, the idea of the universality of their content being conditioned by consciousness was ruthlessly criticised by Hegel.

In contrast to Kant, Hegel interprets the nature of categories from the standpoint of objective idealism. The categories, he says, arose not in the process of the reflection of reality in consciousness but as a result of the development of ideas, of pure thought, which existed before and independently of the material world and sensuous things. Through categories, which are generated one after the other, the Absolute Idea unfolds its content and is transformed into nature, into the material world, and is embodied in material entities, in things. Here, without being conscious of itself, it undergoes a certain development, after which, having discarded the alien form of physical existence, it again returns to its appropriate spiritual element, and

later, by becoming aware of the path it has travelled in the process of the development of knowledge, returns to itself and then exists eternally in the form of the Absolute Spirit.

Thus in Hegel's view the categories are ideal essences expressing elements of the Absolute Idea and at the same time stages in its dialectical development. As forms of the creative activity of the Idea they determine the essence of material things, which derives from them and is reproduced in pure form as the result of cognition.

Having presented this universal picture of the dialectics of the self-development of the concept of categories and perceived a great number of the actual universal laws of development of objective reality and cognition, Hegel made the dialectic of categories determinative, superior in relation to the dialectic of things, turning the latter into a particular case of logic.

After Hegel comes Windelband, who also devotes much attention to the study of the categories and their interconnections in the process of thought. In his view categories are elementary synthetic functions of thought, forms of the synthetic activity of consciousness. Inasmuch as they are cognitive forms of connection and relationship they exist as concepts and judgments. Although Windelband does divide the categories into the constitutive, which exist outside and independently of thought, and the reflective, which exist only in thought and have representational value, all his categories are in the long run inferred from a single source—the synthetic activity of thought. Windelband's view of the nature of categories reproduces, with certain modifications, the Kantian notion of categories as purely a priori forms of consciousness.

Schmitz-Dumont, Wundt and a whole bevy of neo-Kantians infer the categories from the synthetic activity of consciousness, declaring them to be a priori forms of mental activity.

N. Hartmann differs slightly from many of the neo-Kantians in his understanding of the nature of categories. He pictures the world as multi-layered being with consciousness as one of the layers. In his philosophy the categories are treated as characteristics to be singled out from the other layers of being. "All the basic distinctions between the spheres of what exists such as the stages or layers, the general features prevailing within layers and binding their relations," he writes, "take the form of categories."* Hartmann's categories existing outside and independently of human consciousness play the part of universal forms of existence which are differentiated according to the various layers of existence and also constitute a special sphere that is at the very bottom of existence, that is to say, lies at its foundation.

* Nicolai Hartmann, *Der Aufbau der realen Welt. Grundriss der allgemeinen Kategorienlehre*, 3. Auflage, Berlin, 1940, S. 1.

By ignoring the basic question of philosophy, Hartmann avoided the necessity of correlating categories as ideal formations with the material world. In his philosophy they exist on the same level as material forms and not only exist but also provide the foundation and connective principle of all these forms. There is a notably idealist tendency in Hartmann's treatment of the problem.

One finds a clearer acknowledgement of the independent existence of categories as special ideal essences—universals—in the work of the English realist philosopher George Moore. In his view the three different kinds of constituents of the Universe are (1) particulars, i.e., sensuous objects, (2) truths or facts, and (3) universals.*

He particularly criticises the view that there exist only separate sensuous things and that universals are the products of mental activity. He believes that this view arose through the ambiguous use of the words "idea", "conception", "thought", and "abstraction". We apply, he argues, the same names "idea", "conception", "abstraction", both to acts of thought and to objects. Obviously, he continues, all universals are in a sense "abstractions", they are "abstract" things. "...Many philosophers seem to suppose that when you call a thing an 'abstraction', you imply ... that it is the work of the mind." Moore regards this as a profound error. "There is, of course, a psychological process called 'abstraction'—namely, the process of abstraction is a process by which we become aware of universals; it is our *awareness* of them which is a product of the process, not the universals themselves."**

Moore's realist position in defining the nature of categories is perfectly obvious. For him the categories, like any truth, exist not in people's consciousness, but in objective reality, along with material things, and man does not create them in the process of developing knowledge but merely comprehends them.

The notion of categories evolved by Karl Popper is close to that of Moore. Popper postulates three worlds: (1) the physical, (2) the mental world of the specific individual and (3) the world of intelligibles or ideas.*** Popper's third world includes not only universal concepts, but also statements and theories. The objects belonging to the third world, the objective Forms or Ideas, he argues, are often taken for subjective ideas, for objects belonging to the second world. This, according to Popper, is a profoundly mistaken view. Universal ideal essences are objective, they exist outside and independently of the human mind and constitute a special world.

* George Edward Moore, *Some Main Problems of Philosophy*, London, New York, 1953, p. 372.

** *Ibid.*, pp. 370-71.

*** K. Popper, "On the Theory of the Objective Mind", *Proceedings of the XIVth International Congress of Philosophy*, Vienna, 1968, pp. 26-27.

These arguments of Popper's are a variation of the Platonic conception of the nature of categories, and Popper himself makes no attempt to conceal this connection. "I follow," he writes, "those interpreters of Plato who hold that Plato's Forms or Ideas are ontologically different not only from bodies and minds, but also from 'ideas in the mind', that is to say, from conscious or unconscious experiences: Plato's Forms or Ideas constitute a third world *sui generis*. Admittedly, they are virtual or possible objects of thought—*intelligibilia*. The *intelligibilia* are as objective as the *visibilia*, which are physical bodies and virtual or possible objects of sight."*

In contrast to the realist view of the nature of categories, the works of a number of positivists, particularly the semanticists, develop a diametrically opposite, nominalist point of view. The arguments of Stuart Chase and Walpole may be cited as an example of the extreme nominalist treatment of the nature of categories.

Like Moore and Popper, Chase begins his examination of the problem with an attempt to account for the confusion between ideas arising in human consciousness and objectively existing things and defines the cause as wrong use of general concepts and abstractions; but in contrast to Moore and Popper he draws the diametrically opposite conclusion. While the former, proceeding from the fact that people have a habit of confusing the products of their mental activity, i.e., ideal images arising in their consciousness, with their intentions, draw from this the conclusion that people wrongly deny the objective existence of universals, Chase infers from this fact the notion that people are prone to mistake for objectively existing things what are, in fact, only their symbols—the word. "We are continually confusing the label with the non-verbal object, and so giving a spurious validity to the word, as something alive and barking in its own right."** It is this notion, so Chase maintains, that makes people believe that such abstract general concepts as "liberty", "justice", and "the eternal", have living, breathing entity, whereas in objective reality there exist only individual objects, phenomena, and there is not, nor can there be, any such thing as these general essences.***

Thus we can single out in the history of the development of philosophical thought on the problem of categories the following trends: some philosophers believe that categories exist outside and independently of human consciousness in the form of special ideal essences (realist school); the second group declares them to be fictions, mere words that express nothing and signify nothing (nominalist school); the third treats them as forms of mental activity

* Ibid., p. 25.

** Stuart Chase, *The Tyranny of Words*, New York, 1938, p. 9.

*** Ibid.

existing a priori in the human consciousness and constituting its attributive characteristics and inseparable properties (Kantian school); and the fourth regards the categories as ideal images formed in the process of the development of knowledge of objective reality and reflecting the corresponding universal aspects and connections of material things (Aristotle, Locke, and the French materialists of the 18th century).

The dialectical-materialist theory of categories is a further development of the fourth conception.

Like the pre-Marxist materialists, the founders of dialectical materialism regard the categories as ideal images reflecting the corresponding aspects and connections of material things. In contrast to their predecessors, however, who maintained that the content of these images directly coincided with the corresponding properties and connections of things, Marx, Engels and Lenin view these images as a product of the subject's creative activity, in the course of which he separates the general from the individual, reduces it to intrinsic necessary properties and connections, and presents them in pure form. Thus the ideal image representing the content of this or that category and the unity of the subjective and objective does not directly coincide with phenomena, with what lies on the surface of things and processes. On the contrary, it differs substantially from the phenomenon and may even contradict it, insofar as the latter does not coincide with the essence and distorts it. The content of categories must coincide and does coincide to some degree not with the phenomenon but with the essence.

2. THE INTERCONNECTION OF CATEGORIES. CATEGORIES AS STAGES IN THE DEVELOPMENT OF COGNITION AND PRACTICE

The material entities through which matter exists at any given moment do not simply coexist; they are in a state of constant interaction and through this interaction manifest their properties and assert themselves as definite, qualitatively distinct bodies, or phenomena, which in appropriate circumstances pass into one another. Consequently all the phenomena of reality are universally interconnected and interdependent. But whereas the phenomena constituting objective reality are in a state of necessary interconnection and interdependence, the concepts through which man reflects the surrounding reality in his consciousness must also be interconnected, interdependent and mobile, and in appropriate conditions must pass into one another and into their opposites. Only in this way can they reflect the actual state of things. "Human concepts," wrote Lenin, "are not fixed but are eternally in movement, they pass into one another, they flow into one another, otherwise they do not reflect

living life.”* If this is so, the study of concepts presupposes the discovery of their interconnections, their mutual transitions, and the construction of a system that reproduces the necessary relationships of the aspects of the object under investigation.

It should be noted in this connection that what is characteristic of the study of concepts in general naturally refers to the study of categories, which are concepts reflecting universal forms of existence, the universal aspects and connections of objective reality. We can reveal the plenitude of dialectical patterns, regularities, only by examining the categories that reflect them in their organic interconnection and interdependence, by reducing them to a system in which each is in certain relationships with all the others.

Aristotle was the first to study the relationships of the categories and systematise them. But Aristotle’s classification did not and could not reproduce the actual interconnection of categories because it was wholly based on the principles of formal logic. Another defect of Aristotle’s classification is that it does not embrace all the categories that were known at the time and that had been investigated pretty thoroughly by Aristotle himself.

Long after Aristotle came Kant, who also concentrated on analysing the interconnection of the categories. But his classification suffered from similar shortcomings because it was based on the same formal-logical principles. The categories were assigned to groups not in accordance with their historically determined place in the movement of knowledge, but on the basis of one or another of their common attributes. Moreover, Kant like Aristotle included in his system by no means all of the existing categories.

Kant used Aristotle’s classification of the categories but, unlike his predecessor, made them partly dependent on the stages in the development of knowledge and endeavoured to show that there were corresponding categories for every stage that he identified. Thus, for example, according to Kant, the categories of space and time are inherent in the stage of sensuous perception of phenomena, while the categories of quantity, quality, relation and modality are typical of the stage of rational thought.

The problem was dealt with comprehensively for the first time in the philosophy of Hegel, who criticised the Kantian conception of categories and particularly its subjectivistic tendency. But while criticising Kant for subjectivism, he failed to furnish a correct solution to the problem. He criticised Kant not for his idealism, not because he inferred universality, necessity and laws from consciousness, but because he was unable to maintain this view consistently, because he stopped half way and made the laws of consciousness and thought applicable only to phenomena, but not to the world as a

* V. I. Lenin, *Collected Works*, Vol. 38, p. 253.

whole, that is, not to the thing in itself. In other words, Hegel's criticism of Kant was based on the positions of idealism.

It is on the same basis that Hegel builds his solution of the problem but, while demonstrating the interconnection of the categories within the framework of an idealist answer to the basic question of philosophy, Hegel constructs his system of categories on dialectical principles. He shows the categories in their movement, development, and mutual transformation. In his philosophy they are seen as moments or stages in the development of an idea that exists outside and independently of man and the material world. It was no accident therefore that despite his genius and his ability to perceive the actual nature of things he was often compelled, in following his idealist principles and realising them, to contradict reality. All the same, however, in his extremely artificial and contradictory system of categories he did succeed in reproducing a number of the most profound universal laws and connections of reality.

The problem of the interconnection of the categories received a consistently materialist and scientific treatment only in Marxist philosophy. Marx dealt with its political and economic aspects in *Capital*, and Lenin worked out the philosophical aspect in his *Philosophical Notebooks*.

Unlike Hegel, who regarded the categories as moments of development of the Idea in its pre-natural existence and inferred the interconnection between them from the creative activity of thought, Lenin regards the categories as universal forms of reflection of reality and stages in the development of social cognition and practice. According to Lenin, every category is linked with a strictly defined stage in the development of cognition. By registering the universal properties and connections discovered by consciousness at a given stage in its development the categories reflect the peculiar features of this stage and form the strongpoints, as it were, of man's ascendancy over nature, his cognition of nature. In other words, the categories, in reflecting the universal aspects and connections of the external world, are at the same time stages in the development of cognition, moments that register the transition of cognition from certain stages of development to other stages. "Man is confronted," Lenin wrote, "with a *web* of natural phenomena. Instinctive man, the savage, does not distinguish himself from nature. Conscious man does distinguish, categories are stages of distinguishing, i.e., of cognising the world."*

Thus Lenin infers the interconnection of the categories from the regularities of being and cognition. He believes that the relationship between them, reflecting the correlation of the corresponding universal aspects and connections of reality, expresses the necessary movement of knowledge from lower to higher stages.

* V. I. Lenin, *Collected Works*, Vol. 38, p. 93.

According to Lenin, the appearance of any new category is necessarily conditioned by the very course of the development of cognition. It appears because knowledge, penetrating ever deeper into the world of phenomena, reveals new universal aspects and connections that will not fit into the existing categories and demand new ones if they are to be expressed and established.

Now let us follow in general outline the sequence of how man becomes aware of the universal aspects and connections of the world around him, and at the same time the movement of cognition from one category to another.

In contrast to the animal, which behaves according to instincts and habits formed on the basis of conditioned reflexes and does not distinguish itself from its environment, man in acquiring consciousness begins to distinguish himself from his environment, to become aware of his own peculiar mode of life as something different from that of the external world. Having become aware of his own existence and the existence of the external world, man becomes aware of his own separateness, in the same way as he is aware of the separateness of the objects of the external world. To express this separateness of his existence man devises the concept of the separate, of the separate object, phenomenon or thing.

Along with his awareness of his separateness, a certain degree of independence, man also becomes aware of his connection with the external world and the connection of the objects of the external world between themselves. As a living creature he must eat, drink, have a place to live, defend himself from enemies, and so on. Satisfaction of these and other needs presupposes his organic connection with the external world, the use of certain natural objects.

But the interconnection of objects entails their interaction and at the same time a certain process of change, that is to say, motion. Since interconnection is organically linked with motion, man in becoming aware of the interconnection between objects inevitably comes to realise that these objects change, that is to say, are in a state of motion.

At this same stage of cognition man also becomes aware of spatial relationships and time. He has to take into account these relationships in his every movement, in every practical action. No matter whether he is hunting, catching fish, rearing cattle or growing crops, he is inevitably confronted with spatial relationships and extension. He has to deal with areas, distances, heights, depths, extent of motion to right, left, forward or back. He is constantly perceiving spatial characteristics and taking them into account in his everyday life and activity.

By changing the objects and phenomena of nature in the process of labour and converting them into means of existence man also discovers such a feature of change as their duration, and also the

correlation of their given state with preceding and following states, with those that are to occur in the future. Thus he gradually learns to distinguish past, present and future.

Parallel with the transition of knowledge from cognition of the separate (separate objects and phenomena) to cognition of interconnection, motion, space and time man also becomes aware of such universal elements of reality as the individual and the general. Every separate object that man encounters for the first time in his practical activity is perceived as something unique. If it is able to satisfy some human need, it stands out and, as other objects capable of satisfying the same need are discovered, a transition takes place (both in practice and in the mind) from the one object to several objects, to "the many" Comparison of these many objects with one another both in practice and in the mind reveals their identity (similarity), on the basis of which general notions and subsequently general concepts are formed.

At the same stage in the development of consciousness man becomes aware of quality and quantity. When he perceives a separate object as individual or unique and tries to find out what it is, he is reflecting it in its qualitative aspect. Since the object is regarded as such, in itself, without any relation to other objects, its quantity is indistinguishable and in fact merges with its quality. But as cognition begins to pass from one object to many and, in the course of comparing them, establishes their similarity or identity and the difference between them, certain quantitative characteristics begin to emerge. Every aspect, every property of quality is divided, as it were. Besides what it is, it reveals its magnitude, the degree of its manifestation and distribution, in a word, its quantity.

When they are first discovered, qualitative and quantitative characteristics do not reveal their interdependence. They appear to be independent of each other. But as knowledge becomes more profound people realise that separate qualitative and separate quantitative characteristics are interconnected. At this point they begin to discover an organic connection between qualitative and quantitative aspects. They notice that a certain quantity corresponds only to a strictly determined quality and, vice versa, for any given quality there is a strictly defined quantity.

As they come to know the interconnection between separate qualitative aspects and quantitative characteristics of objects and the interconnection of quantity and quality, people begin to realise that changes in one aspect or phenomenon cause certain changes in another aspect or phenomenon. But that which gives rise to something else is its cause, and that which arises is the consequence. Thus knowledge of the interconnection between separate qualitative and quantitative aspects leads man to the discovery of causality and at the same time to the need to formulate the categories of cause and effect.

As they get down to the business of investigating the connections of cause and effect that they have discovered, people realise that they are very closely linked, that one cannot happen without the other and if one happens the other must also occur. In other words, they discover an element of necessity in this connection.

Thus people first become aware of necessity as a property of the connection between cause and effect. In the course of the further development of cognition, however, the concept of necessity is refined and expanded. Not only causal connections but any connections that are bound to occur under certain circumstances, any aspects or properties inherent in the material entities under investigation, come to be regarded as necessary.

The necessary connections discovered in the course of the development of knowledge are often stated in science in the form of laws, that is to say, people become aware of them through the category of law, which signifies and reflects general stable and necessary connections and relationships.

Parallel with the motion of cognition from causality to necessity and law there is a transition to the categories of content and form. This transition comes about because cognition does not stop at detecting a separate causal connection but, under the pressure of practical activity, which demands for its development ever fuller knowledge of the objects of the external world, passes on from one causal connection to another, from the explanation of one property of a material entity to another. As knowledge of the causal connections concerning any given sphere of knowledge accumulates, a need is felt for a new category, the category of content, which signifies the totality of all the interactions and the changes they cause in any given material entity. But in cognising these interactions and subsequent changes we perceive, and step by step reproduce in our consciousness, first the external and then the internal means of uniting the elements of content, the relatively stable structure in which all the interactions and changes inherent in the material entity occur, that is to say, its form.

Discovering the distinction between necessity and chance and formulation of particular laws is not enough, however, to tell us about the object as a whole. No matter how many aspects and connections we get to know they cannot give us the full picture because they can never be more than the mechanical sum-total of separate aspects of the material entity. But a material entity is not a mere totality of its aspects; it is an organic whole, the dialectical unity of these aspects. So it becomes necessary to unite all these aspects and connections into a single whole, to infer them from a single principle. The reproduction in man's consciousness of all the necessary aspects and laws of the object under investigation in their natural interconnection and interdependence is the cognition of essence.

Movement towards essence begins with the discovery of the base, the basic (determining) aspects and relationships. These basic aspects and relationships determine the formation, the functioning, the direction of change and development of all other aspects of the given material entity. So, if we take them as our point of departure we are able step by step to reproduce in human consciousness the interconnection of other aspects as well and determine the place, role and significance of each of them.

But to do this the basic aspects (relationships) and the material entity itself must be examined in their origin and development, which in its turn entails discovering the source of development, the motive force that propels the entity forward determining its transitions from one stage of development to another. This source of development is contradiction, the unity and struggle of the opposite aspects and tendencies inherent in all phenomena and processes of reality.

Thus the development of knowledge brings us to the necessity of discovering the contradictions, i.e., the opposite sides and tendencies inherent in things and phenomena. When we have discovered the contradictions in the base and traced their development and the changes they cause in other aspects of the whole object or phenomenon, we are bound to notice that development takes place through the negation of certain qualitative states by others, the retention of all that is positive in the negated states and the repetition of the path travelled on a new and higher basis.

By reproducing in our consciousness the essence of any given object we are able to judge not only what it is at the moment, in its given relationships, but also how it will behave in other relationships. What is more, if we have learned how the object arose, what basic stages it has passed through in its development, we can predict with certainty what it will become in the future, in other conditions. In other words, if we have discovered the essence of a thing we are able to judge its possible as well as its actual states. Hence the need to distinguish between the actual and the possible.

The pattern of development of cognition from one category to another can be traced in the advance of scientific knowledge. Since the categories are necessary stages in the development of social knowledge, movement from one of them to another is bound to manifest itself in any field of knowledge.

For example, from the history of our knowledge of electrical phenomena we know that in ancient times amber was discovered in the form of separately existing objects. When craftsmen began to fashion amber, it was noticed that on being rubbed it acquired the ability to attract other objects. At first these were all individual observations arising from individual cases when amber was subjected to polishing. As the phenomenon repeated itself, however, a general notion of amber as a substance in which friction produced electrical

properties was evolved. The further history of the development of the concept of electricity was connected with the discovery of more and more bodies which displayed electrical properties when subjected to polishing, and thus with the formation of more and more general notions of electricity. At the end of the 16th century the English scientist William Gilbert discovered this property in diamonds, sapphires, amethysts, rock crystal, sulphur, resin and other substances. It was subsequently established that the power to attract other, lighter bodies belonged to all bodies that did not conduct electricity. At the beginning of the 18th century (in 1729) the English physicist Stephen Gray inferred from a number of his electrical experiments that even bodies that did conduct electricity possessed this property. He proved that if these bodies were placed on an insulated stand they could be electrified by means of friction.

In the course of these investigations the qualitative and quantitative characteristics of electrical phenomena were also discovered. After all, once the hitherto unknown unique property possessed by polished amber in attracting other bodies had been discovered, it was natural enough to try and find out what this phenomenon was in particular, i.e., to explain its qualitative aspect. For this purpose it was compared with other phenomena. In the year 1600, for example, Gilbert, comparing electrical and magnetic phenomena, observed that electricity could be produced by friction, that it disappeared on contact with certain bodies, and so on. Somewhat later, in 1672, Otto von Guericke established that besides electrical attraction there was also such a thing as electrical repulsion. In 1729 Gray concluded from a series of electrical experiments that all bodies may be divided into conductors and insulators.

In 1730 Charles Du Fay established that electricity was not qualitatively homogeneous, that there were two kinds of electricity. In 1749 Franklin discovered that when bodies were electrified the two kinds of electricity always appeared in them in equal quantities. A few years later John Canton demonstrated the ability of a body resting on an insulated stand to absorb electricity when a charged body was placed close to it. Thus by discovering the properties of electricity step by step scientists built up an ever more complete picture of its quality.

After concentrating on the qualitative aspects of electrical phenomena they began to take more interest in the quantitative side, in discovering the quantitative characteristics of these phenomena. These researches, beginning with Charles Coulomb (or rather Cavendish, although his work was unknown to his contemporaries) and culminating in the discoveries of Faraday, constituted a whole epoch in the development of notions of electricity. A large number of laws relating to various aspects of electrical phenomena was discovered.

As knowledge of separate necessary aspects and connections (laws) between various physical phenomena accumulated, attempts were made to find out in what way these laws depended on one another and to unite them in some sort of unified theory, that is, to present them as a system of concepts dealing with the essence of electricity. This stage is illustrated by the period when Maxwell developed his theory of magnetism. With the discovery of the negatively charged electron and the positively charged proton the atom came to be regarded as a material entity consisting of equal numbers of electrons and protons. The discovery of the electron as a component of atoms of any substance told us why some bodies are conductors of electricity and others are not. The answer lay in the structure of the electronic shell of atoms. Once the electronic structure of substance was understood it became possible to explain such electrical phenomena as galvanic current, thermoelectricity, and so on. The electron turned out to be the basis, the basic element, from which one can explain many electrical phenomena, present them as a unified and interconnected whole, as a united chain of the manifestations of the electronic nature of substance.

Thus the development of knowledge of electricity shows that knowledge in its elementary form begins with the discovery of certain separate phenomena. This separate phenomenon is at first taken to be something unique, but comparison with other phenomena (things) reveals the general, and movement thus occurs from the less general to the more general and finally to the universal.

The sequence of cognition of the universal forms of existence, the universal properties and connections of reality in the sphere of electrical phenomena basically corresponds to their relationship as stages in the development of social cognition.

Knowledge of the universal forms of existence comes about in the course of practical activity, in the process of the purposeful transformation of reality. These universal properties and connections are expressed not only in ideal images and concepts arising in the course of the development of knowledge, but also through the tools which people make and the forms which their activity assumes. Thus in the formation of this or that category not only the specific nature of the corresponding stage in the development of knowledge is reflected, but also the peculiar features of the forms of people's activity prevailing in that period of the historical development of society, the forms of their relationships with each other and with nature. For example, the interconnection, interaction and change (motion) of which man became aware as universal forms of existence in the initial stages of the development of knowledge were the necessary and universal elements of labour, which may be defined as the purposeful transformation of the objects of nature into means of livelihood.

Labour activity sets out to change an object or natural phenomenon by influencing it with another object (a tool, an instrument of labour), that is to say, by placing these objects in a certain relationship with one another. In the process of labour, by putting objects in a different relationship from that of their natural state and making them interact, man succeeded in changing them in the way he needed. And as he did this and observed this thousands of millions of times he inevitably came to the conclusion that everything in his environment was in a state of interconnection and interaction, hence the changes and transformations that took place. In fact, it was this circumstance—his belief that the objects of the external world are all in a state of interconnection and interaction and are thus capable of change—that provided one of the necessary conditions for the conscious organisation and further development of production. If a person did not know or was not convinced that the objects around him could change, he would not attempt to exert any influence over them, he would not organise any sort of production. The very fact of the functioning and development of production among the ancients testifies to the fact that they were aware of this ability of the objects of the external world to change as a result of their interaction, and also that they made successful use of this knowledge in their labours.

This is also illustrated by the history of the development of technology. For example, the first ways of making fire were based on the friction of one object on another, and the first electrical machines were also based on interaction.

An example of the influence of practical activity, and particularly of the forms of relationship between people that become established in society, on the evolution of categories is to be found in the way Heraclitus proved universal interconnection and motion based on the unity (or universality) of the primary nature of all that exists. Arguing that all the observable phenomena in the world are interconnected and pass into one another because they have one nature—fire—Heraclitus used as a comparison the commodity-money relationships existing in the society of his day and the special role of gold in these relationships. He wrote: "All things are exchanged for fire and fire for all things, just as wares for gold and gold for wares."*

The dependence of the formation of categories of dialectics, their reflection of various aspects of practical activity, was always emphasised by Marx and Engels. For example, in demonstrating the connection between the categories of the individual and the general with people's forms of life and activity, Marx wrote: "But what would old Hegel say if he heard in the next world that the *general* [das *Allgemeine*] in German and Norse means nothing but the common

* *The Fragments of the Work of Heraclitus of Ephesus on Nature*, Baltimore, 1889, p. 89.

land, and the particular [das *Sundre*, *Besondre*—nothing but the separate property divided off from the common land? The logical categories are in that case damn well arising out of 'our intercourse' ”*

All this goes to show that the categories are not only stages in the development of knowledge but also stages in the development of people's social practice, their relations between themselves and with nature. As stages in the development of social cognition and practice, the categories reflect not only the universal forms of existence, the universal properties and connections of reality, its universal laws, but also the laws of the movement of knowledge from the lower to the higher, the laws of the functioning and development of thought.

“...The categories of thought are not an auxiliary tool of man, but an expression of laws both of nature and of man.”**

And in another place, quoting Hegel's statement that the movement of consciousness “like the development of all natural and spiritual life, rests on the nature of the pure essentialities which make up the content of Logic”, Lenin says: “Turn it round: Logic and the theory of knowledge must be derived from 'the development of all natural and spiritual life' ”***

Taking shape in a definite sequence in the course of the development of social cognition, the categories assume corresponding necessary connections and relations to one another, thus forming the structure of mental activity, the logical structure of knowledge, the universal forms of the movement of thought. In the process of cognising an object the subject becomes aware of it through the network of the categories that has taken shape in his consciousness, makes his own categorial synthesis and thus discovers the object's inherent properties and connections and, after that, the specific forms in which they manifest themselves in the given specific field of reality. At the same time the subject discovers the qualitative and quantitative characteristics of the object, its inherent causal connections and the laws of its functioning and development.

From all this it follows that the categorial structure, while ensuring the movement of thought towards truth, is tested in its every cognitive and practical action, in every operation of thought, and through this frequent repetition and reaffirmation in practice becomes an axiom, leaving no doubt in anyone's mind as to its universality (usefulness for getting to know any object) and truth.

“When Hegel endeavours—sometimes even huffs and puffs—to bring man's purposive activity under the categories of logic, saying that this activity is the 'syllogism' ... that the subject (man) plays the role of a 'member' in the logical 'figure' of the 'syllogism' and so

* Marx, Engels, *Selected Correspondence*, Moscow, 1975, p. 190.

** V. I. Lenin, *Collected Works*, Vol. 38, p. 91.

*** Ibid., p. 88.

on,— THEN THAT IS NOT MERELY STRETCHING A POINT, A MERE GAME. THIS HAS A VERY PROFOUND, PURELY MATERIALISTIC CONTENT. It has to be inverted: the practical activity of man had to lead his consciousness to the repetition of the various logical figures thousands of millions of times *in order that* these figures *could* obtain the significance of *axioms*. This nota bene.”*

Thus the categories of dialectics are ideal images that reflect and express in pure form the universal properties and relationships of things, the universal forms of being which exist in objective reality in organic connection with the individual and particular.

As a product of cognitive activity, the categories reflect the peculiarities of those stages of cognition by which they were formed and, through the resultant necessary relations between them, the laws of the movement of knowledge from the lower to the higher, the laws of the functioning and development of thought.

Finally, since they are connected with practice, which materialises in instruments of labour and forms of activity the universal forms of existence they reflect, the universal properties and relations of things, the categories in one way or another reflect the laws of the functioning and development of practical activity.

3. THE RELATION BETWEEN THE LAWS AND CATEGORIES OF DIALECTICS

Laws and categories have much in common and it is no accident that some philosophers deny that the categories are the basic laws of dialectics while others regard laws as categories. So let us take a general look at the problem.

The feature which both laws and categories have in common is that they reflect the universal forms of the existence of matter, the universal conditions of being. The contradiction, the interconnection between quantity and quality and the repetition of the path travelled on a higher basis in the course of the negation of some material entities or states by others are as universal as causality, form and content, necessity, and so on.

But within the framework of their common features there is also a difference between the laws and categories of dialectics. The laws of dialectics reflect the universal connections and relationships operating in nature, society and human cognition. The categories, in addition to this, reflect also the universal aspects and properties of reality. In other words, the content of the categories is richer than that of the laws.

* V. I. Lenin, *Collected Works*, Vol. 38, p. 190.

For example, the law of the transformation of quantitative into qualitative change reflects only the interconnection of quantity and quality.

Some authors believe that categories reflect only aspects and properties, but not the interconnections between these aspects, which, they maintain, are reflected by the laws. This is a long way off the mark. These writers confuse the content of the definitions of certain categories with the content of the categories themselves. The definitions of the categories, it is true, do not include the regularities, laws of the interconnection between the aspects or elements of reality reflected by these categories. They register only the specific and essential, which allows us to identify the categories and set them apart. But the definition of categories, like the definition of any other concept, does not and cannot account for their whole content. The content is richer and more varied than the properties or attributes revealed by the definition. The content includes not only the corresponding aspects and properties, but also the interconnections between them and with other aspects of material entities. To be specific, the content of the category of quantity is by no means exhausted by the sum-total of properties indicating the magnitude of a thing, its dimensions, which usually figure in the definitions of the category in question. The content of the category also includes the fact that quantity is organically connected with quality, that at a certain stage of its change it evokes a change of quality, and that its characteristics depend on qualitative characteristics. In other words, the category of quantity includes in its content properties that characterise quantity and the regularities, laws of the interconnection between quantity and quality. The same is true of the category of quality. Its content includes not only the properties that indicate what quality is, but also the properties expressing its interconnection with quantity, specifically the fact that its differences are determined by quantitative differences, that it changes under the influence of quantitative changes, and so on.

The same may be observed in the relation between the content of the law of the unity and struggle of opposites and the content of the category of "contradiction". The law of the unity and struggle of opposites reflects and establishes the fact that between the mutually exclusive and yet united opposites characteristic of this or that material entity there is a struggle, and that the struggle in the end leads to the resolution of the contradiction and the transition of the thing from one qualitative state into another. The category of "contradiction" includes in its content all these elements and a number of others which are not accounted for in the law of the unity and struggle of opposites. The category of "contradiction" establishes the fact that contradiction is interaction between opposed aspects, or a struggle of opposites. In addition, the category of contradiction also indicates the

necessity of distinguishing between contradictions: internal and external, essential and inessential, basic and non-basic, major and minor. It establishes points concerning their role and significance in the development of material entities, specifically the fact that they are the source of motion and development, etc.

Thus the content of the category of "contradiction" is much richer than that of the law of unity and struggle of opposites.

We find the same thing in observing the relationship between any categories and their corresponding laws. Take the category of content and form and the related law that form is determined by content. All that this law establishes is that in the relationship between content and form content is the determining factor, that form arises and changes in response to new or changed content. The categories of content and form reflect more than this. For example, the category of content, in establishing the fact that content is determinative in relation to form, also includes the fact that content is the sum-total of the internal processes of a thing or phenomenon, that it is constantly changing, "flowing", and that in its development it anticipates form, that its corresponding form offers wide scope for its development, and so on.

That the categories include in their content the corresponding laws is demonstrated by the fact that most of the laws of dialectics are not treated as independent objects of study but are considered as certain elements in the content of their various categories. For example, the law of causality is not studied as such, in isolation, but only in connection with the categories of cause and effect, only as a part of their content. The same is true of the law of the interconnection between necessity and chance, which is considered in connection with the content of the corresponding categories. And the same is true of the law of the mutual transition of the individual into the general and the general into the individual, the law that form is determined by content, the law that form actively influences content. These laws are reproduced in the consciousness only as components of the categories of the individual and the general, form and content.

Admittedly, there are laws of dialectics which we conceive not as elements of the content of certain categories, but in themselves. These are the law of the conversion of quantitative change into qualitative change, the law of the unity and struggle of opposites, and the law of the negation of negation. These laws are considered independently not because their content does not form part of the corresponding categories, but because they, unlike other laws of dialectics, are the basic laws determining other laws and manifesting themselves in one way or another through them. Thus, for example, the law of the unity and struggle of opposites determines certain regularities of the interaction of the individual and the general, quantity and quality, cause and effect, form and content, necessity and chance, possibility and actuality, and so on, and manifests itself

in one way or another through them. Indeed, the particular and the general, form and content, necessity and chance, possibility and actuality, etc., are opposites which under certain circumstances pass into one another and become identical.

The law of the conversion of quantitative into qualitative changes acts in the same way. It manifests itself in the interaction of the elements or aspects reflected by all the paired categories. For example, a change in the quantity of the individual inevitably changes it into the general (new quality) and, vice versa, a quantitative change in the general makes it into something individual. Further, accumulation of quantitative changes in content sooner or later brings about a change of form, accompanied by transition of the given material entity into a new qualitative state. Finally, a certain intensification of an accidental attribute corresponding to the conditions of existence of the given material entity turns it into a necessary attribute, thus giving it a qualitatively new state.

Since the above-mentioned laws of dialectics are basic and determinative for all other universal connections and relationships, it is quite natural and necessary to single them out of the content of the corresponding categories and present them as special objects of attention.

A. S. BOGOMOLOV

**DIALECTICAL CONTRADICTION AND ITS SOLUTION.
CONCERNING THE CENTRAL PROBLEM
OF DIALECTICAL LOGIC***

Probably no other problem of dialectics has been beset with such misunderstandings and mutual incomprehension, has generated such prolonged and persistent argument, as the problem of contradiction. There are disagreements about it even among the like-minded, among people who support the idea of dialectical logic. As for its opponents, the view advanced by such a well-known philosopher as Karl Popper is indicative. He maintains: "A statement consisting of the conjunction of two contradictory statements must always be rejected as false on purely logical grounds."**

I have intentionally taken this quotation from Popper's widely-known *What Is Dialectic?* because it clearly expresses an extremely widespread and yet erroneous, even from the standpoint of contemporary formal logic, opinion. Without setting myself any special critical aims I shall begin with the question of what the law of contradiction in formal logic actually forbids, and why the "dialecticians" venture to assert that a statement consisting of contradictory or opposed statements, that is to say statements which deny each other, should not, and indeed cannot, always be rejected as false on purely logical grounds.

**1. NEGATION, CONTRADICTION AND THE DEVELOPMENT
OF KNOWLEDGE**

Formal-logical studies of negation long ago established that the sign of negation, usually expressed in ordinary speech by the particle "not", may have many different hidden implications, and that in various systems of logic they must be strictly defined and distinguished one from the other. Thus, in classical logic there is one

* This article is a development of the ideas advanced by the author in a paper read at the 14th International Philosophical Congress: A. S. Bogomolov, "On Solution of Contradictions as a Mode of Building of Concepts", *Proceedings of the XIVth International Congress of Philosophy*, Vienna, 1968, pp. 341-47.

** K. Popper, *Conjectures and Refutations*, New York, 1965, p. 316.

negation, while in the many-valued logics there may be one, two, three or more types of negation, and structural logics permit a whole hierarchy of types of negation, the differences between them depending on their intensity and field of application. In classical logic the negation of a true judgment produces a false judgment, whereas in many-valued logic it may produce either a false or an indefinite judgment. This leads to a change in the status of the “absolute” laws of thought, such as the law of contradiction and the law of excluded middle. Thus they are tautologies in classical logic, that is to say, they have the status of “logical truth”, but in some kinds of many-valued logic the situation is quite different. The law of excluded middle is not a tautology in all many-valued logics, the law of contradiction is not a tautology in some of them, and so on.

Thus the “simplest” logical operation turns out on closer investigation to be fairly complex and this complexity derives from the great diversity of objective relations in reality which formal logic seeks to express by means of the given operation. However, this operation must include at least two specific abstractions and the problem of contradiction cannot be understood without taking them into account. The first abstraction is the restriction of all operations to the field of invariable relations and invariable contents of the forms of thought with which these operations are performed. This abstraction is necessary because it would otherwise be impossible to achieve the formalisation itself, that is, the expression of relations, contents and operations by means of *symbols* presupposing the invariance, the stability of what they express. The second abstraction deriving from this is the restriction of formal logic to the sphere of sign systems (“sign languages”). This restricts the investigation to only one sphere of the expression of thought—language. But although language is indeed “the immediate actuality of thought”,* it has never been its *only* actuality. Another no less, if not more, important reality of thought is human practice and its results. This fact was long ago established by human common sense and registered in folk wisdom in the words of the Gospel: “by their fruits ye shall know them. Not every one that saith unto me, Lord, Lord, shall enter into the kingdom of heaven” (Matthew 7, 20, 21) or, if you prefer the “Missouri argument”: “Do not tell me how to make it—make it!” This rather elementary thought is sometimes forgotten, however, by modern philosophers, and yet its application in philosophy reveals tremendous prospects for the theory of knowledge, implying the necessity of its including *practice*. This was Marx’s great service to philosophy.

In relation to the problem under discussion it means that formal logic, in view of its special abstractions without which it would be

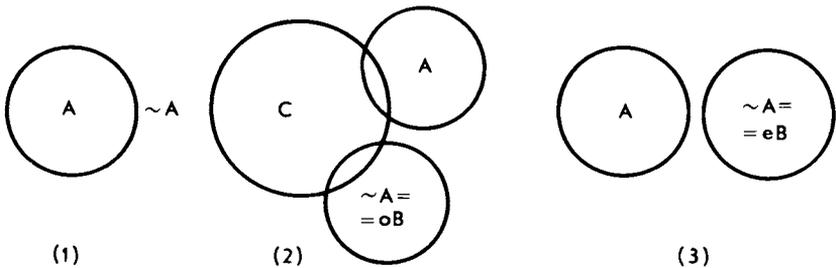
* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, p. 446.

quite inconceivable, cannot claim the role of sole basis and apparatus of epistemological investigation. Formal logic is *necessary*, but *not sufficient*, and if we wish to make an epistemological, theoretical-cognitive investigation, there must be some more profound and more general science of thought. Such a science is dialectical (or, if you prefer it, philosophical, theoretical-cognitive) logic.

The general character of dialectical logic in relation to formal logic may be defined as follows. (1) Unlike formal logic, which may be regarded as the science of the laws and forms of the invariable transformation of thought, dialectical logic is concerned with thought *as a whole*, and particularly with thought that changes in its content. Since the constant is an extreme case of change (zero change), formal logic becomes an extreme case of dialectical logic. (2) Dialectical logic has as its subject-matter the sum-total of the reality of human thought, that is, practice. A particular case of the latter is *language practice*; in this connection formal logic also becomes a particular case of dialectical logic. (3) Naturally, dialectical logic cannot be regarded as a science directly studying people's practical activity ("praxiology"). Here it is based on *scientific knowledge*, which studies man's practical activity, and this knowledge includes formal logic. So the "model" of reality studied by dialectical logic is not language, as it is for the formal logic of today, but *scientific knowledge* in its development, in all the multiplicity of its processes and results.

But what effect does this have on our understanding of negation and contradiction? In the most general form, ignoring for the time being the complex operations of negation in many-valued, intuitionist and structural logics, we could say that formal-logical negation expresses extreme extensional (volumetric) relations of classes (sets) of objects, these classes necessarily being understood as constants, invariable in volume and content. For our purposes it is important to note here two forms of negation: indefinite ($\sim A$) and definite ($\sim A=B$). The latter in its turn may take the form of a particular definite negation ($\sim A=oB$) or a general definite negation ($\sim A=eB$).

In diagram form this may be expressed as follows:



It is not difficult to see that these are different kinds of negation and that they stand in different relations to the law of contradiction. Thus the conjunction of a statement and an indefinite negation or general definite negation is inadmissible, whereas the conjunction of a statement and a particular definite negation may be admissible. For example, if A means "sweet", its indefinite negation will be "not sweet", and its definite general negation will be "bitter". An object cannot combine the properties of sweet and not sweet, sweet and bitter. But a definite particular negation of "sweet", for example, "white" (white is *not* sweet) may be compatible with it.

Of course, it may be argued that these operations are not negations. The "sweet-bitter" or "sweet-white" pairs are comparisons of positive predicates, quite commonplace and well known in formal logic, which refers them to compatible and incompatible concepts. To translate positive predicates into negations would mean creating unnecessary difficulty and adopting the position of the "intellectualism" of Francis Bradley, who argued that sugar is sugar and sweet is sweet (i.e., not white), and the one could not be the other. "In Mr. Bradley's difficulty in seeing how sugar can be sweet intellectualism outstrips itself and becomes openly a sort of verbalism."* James' perceptive criticism of Bradley, however, ended in his open, candid and complete rejection of logic. But for the formal logicians it meant restricting their inquiry to fixed concepts with an established scope and content and going no further than revealing the relationships between them. But in dialectical logic it is the *interrelationship* of these types of negation, the *transition* from one to the other, which dominates the scene.

In other words, the investigation of the relationship of two objects (classes or sets of objects or properties) begins with establishing the *difference* between them, expressed in the most general and abstract form, with their mutual negation (A and $\sim A$). To put it differently, the second object acts initially as the simple negation of the first and is naturally expressed in logic by its indefinite negation. In this case, transition from the abstract to the concrete occurs through specifying or revealing the empirical qualification of the phenomena under investigation. Describing this kind of development of the concept, Hegel saw in it the transition from absolute difference to essential difference (variety), and from this to opposition (antithesis), as one of the stages of the general path from identity through difference to *contradiction*.

This commonplace example shows that formal-logical contradiction does not always appear as a logical fallacy that must in some way be "eliminated". Regarded from the standpoint of the change, the

* William James, *A Pluralistic Universe*, New York, 1916, p. 220. Cf. F. H. Bradley, *Appearance and Reality*, Oxford, 1969, pp. 16-17.

development of knowledge, the development of the *content* of thought, contradiction manifests itself as a point of departure in this development, as a stage in the development of knowledge and—the main thing!—a motive force for further cognitive activity. Consequently contradiction cannot be regarded in all cases as a symptom of the falsity of our proposition. If we are confronted with a contradiction we must first find out what follows from this contradiction, and this is by no means a formal question.

For the sake of clarity let us take a well-known example. Euclidean geometry contains among its initial propositions the so-called fifth postulate, which—without quoting its extremely complex formulation in full—says in effect that “through a point not on a given straight line there can be drawn one and only *one* straight line that does not intersect with the given straight line” Let us call this proposition A. The fact that we have operations of negation in logic prompts us to try and formulate the negation of A and assert that “through a point not on a given straight line there can be drawn *not one* (i.e., more than one) straight line that does not intersect with the first” This will be proposition $\sim A$. The law of contradiction, taken in its traditional sense, compels us to acknowledge that since A and $\sim A$ are incompatible, the truth must lie with either the first or the second proposition. Consequently, because we know that A is true (Euclidean geometry is non-contradictory), $\sim A$ will be false.... And at this point there begin the attempts to *prove* the fifth postulate and thus refute its negation that have been going on for thousands of years with the well-known result that no one has been able to prove the fifth postulate.

The mathematicians and philosophers who reasoned along these lines assumed that in their attempts to refute the negation of the fifth postulate they were proceeding from the immutable law of formal logic, the law of contradiction, which commands us to *eliminate* a contradiction by acknowledging as true only one of opposed or contradictory judgments. However, the further development of geometry led to the “mad” theory which maintained that besides Euclidean geometry with the fifth postulate it was possible to have another geometry asserting that through a point not on a straight line there could be drawn not one but *any number* of straight lines that would not intersect with it (Lobachevsky’s geometry). But this assertion can also be negated by saying that through any point outside a given straight line *no* other straight line can be drawn in the same plane that does not intersect with it. And at this point we arrive at the geometry of Riemann. This geometry, in its turn, is divided into spherical geometry, in which the second straight line intersects the first straight line at two points, and elliptic geometry, in which intersection takes place at one point. In the case of Riemann’s

geometry one has to reorganise other axioms of Euclidean geometry, whereas this is not required for Lobachevsky's geometry.

But now let us try to reproduce the reasoning of the geometers who created the non-Euclidean geometries. The very first thing they did was to ignore formal logic's law of contradiction, rightly assuming that in the given case *for some reason* (no one knew why!) it would not "work", so that the truth of the geometry with the fifth postulate did not exclude the truth of the negation of the fifth postulate. However, the "indefinite negation" of the fifth postulate still did not amount to a concrete formulation of a statement that would replace the fifth postulate. The formula "...not one (i.e. more than one) straight line..." ought to give way to the formula "...any number of straight lines..." And this, in the terminology we have been using, would be a "definite negation" And its negation leads in turn to a new definite negation, to the statement "...no other straight line...". And here we discover why the law of contradiction failed to "work" at the starting point of our reasoning. The fact is simply that the *fifth postulate and its negation (definite negation!)* are true in different geometrical systems the coexistence of which, given the truth of Euclidean geometry, was categorically rejected. Why? Because of the absolute authority of the law of contradiction, which allegedly maintains that the conjunction of two contradictory statements must be regarded as false on purely logical grounds. Moreover, it was persistently "forgotten" and is still being "forgotten", as soon as the question of epistemological analysis arises, that formal logic makes its judgment only with regard to a scientific question that has *already been solved*, about statements that have been thoroughly clarified and defined in all their particulars.

But does this not amount to saying that science has no need of any "dialectical logic", because the refinement of concepts and solution of scientific problems are the usual operations of scientific knowledge, the empirical or deductive procedures aimed at eliminating (removing) contradictions generated by the inadequacies or incompleteness of our knowledge? Is this not the standpoint of all the "defenders" of formal logic, the people who believe it to be their sacred duty to uphold the status of formal logic as the sole and exhaustive science of correct thinking? Is this not what Karl Popper is writing about when he states so emphatically that "all criticism consists in pointing out some contradictions or discrepancies, and scientific progress consists largely in the elimination of contradictions wherever we find them".* No, it is not. And this is why not. The discovery of a contradiction and its elimination involve, in principle, a formal operation performed on the theory, or part of it, in order to bring it into accord with another theory, or part of a theory, that has been accepted as true. If we do not succeed in this, we must get rid of the contradictory theory (or the

* K. Popper, *The Open Society and Its Enemies*, Vol. 2, London, 1966, p. 39.

theory that contradicts the theory which we think is true) and seek a new solution.

But here we are again confronted with the procedure that was recommended for geometry by the people who imagined the idea of a non-Euclidean geometry to be the ravings of a madman, whereas it was in fact only a "mad theory", a term which, thanks to Niels Bohr, has won a very positive place in science. The former view is expressed by Karl Popper, when he says: "...science proceeds on the assumption that *contradictions are impermissible and avoidable*, so that the discovery of a contradiction forces the scientist to make every attempt to eliminate it."* In contrast to this, the dialectician says that *contradictions necessarily and inevitably arise* in the process of scientific progress; the scientist has to *resolve*, rather than avoid or eliminate them, if they appear.

In other words, the metaphysician, that is, the person who absolutises formal logic and reduces all the procedures of science to the formal-logical processing of observations or the formal-logical inference of all possible conclusions from axioms, sees in the contradiction a symptom of a sickness and treats this symptom in order to eliminate it and cure the sickness, and if the sickness will not go, then, alas, the sick man must. The dialectician sees in contradiction a symptom of a beneficial crisis from which the sufferer will emerge a new man. Or, to offer another simile, the destruction of the chrysalis from which the beautiful butterfly emerges. For the metaphysician contradiction is always the effect and symptom of error. For the dialectician (if, of course, we are not talking about an actual mistake that has to be discovered and put right) the contradiction is a symptom and indicator of changes that have matured, of qualitative changes in a theory that will raise it to a higher level of development.

The metaphysician's position has its grounds. It is based on yet another specific abstraction of formal logic of which we have not yet had occasion to speak. This abstraction consists in the fact that, before it can be applied, formal logic demands complete concepts and relations that are fully established in both their range and content; the material that it processes must by definition have, at least implicitly, an established or fixed content. But this is a very powerful abstraction, which ignores the process of the development of knowledge. In order to express knowledge of a higher order, formal logic requires newly-evolved invariable laws but, as we know, it cannot produce them itself. For this we have to apply all the other means of developing scientific knowledge—empirical research, the proposing of hypotheses, scientific intuition, and so on. In other words, there must be a study of *content*.

* Ibid.

Thus the hypothesis proposed by dialectical logic on the development of scientific knowledge is that this development proceeds by means of resolving contradictions which necessarily arise at “nodal points” in the general progress of science, “at the borderlines” of a theory that is developing according to certain laws. In the new theory the contradictions of the previous theory are not “eliminated”, they are “transcended” (*aufheben*)* in the Hegelian sense, that is, their positive content is retained and they no longer appear in their initial form of a logical contradiction. This concept, formulated by Hegel, has been expressed in modern science in the “correspondence principle”, which in a more generalised form states that theories whose correctness is authentically established for a given objective field are not abandoned as false as soon as a new more general theory arises but retain their significance for the former field as an extreme case of the new theory. Further we shall examine how this principle of correspondence may be applied to the problem of contradiction.

We are now faced with the question of how our hypothesis can be proved, on what theoretical grounds it is based and how it is to be realised. I should like to submit three fundamental theses in support of the hypothesis that solving contradictions is a means of developing knowledge.

1. In the 20th century formal logic considerably refined its thesis that (within the bounds of formal logic!) a statement consisting of two contradictory statements must always be rejected as false on purely logical grounds. The refinement consisted in advancing a new thesis: contradiction implies anything we like, that is to say, from a pair of contradictory statements there “follows” *an infinite number of statements*. For formal logic this means that from a contradiction *nothing can be inferred*. But for dialectical logic it suggests that a statement consisting of the conjunction of two contradictory statements cannot be cast aside on formal grounds, but should be studied with a view to discovering beyond this formal contradiction the essential contradictions. Because insofar as anything may be derived from a contradiction—truth or falsehood—it is possible to restrict the field of meaning of the given contradiction so that it implies (not in the formal sense!) a true statement. How this is to be done is the question which dialectical logic must answer. And it is on this point that Lenin’s definition of dialectics is particularly relevant: “*Dialectics* is the teaching which shows how *opposites* can be and how they happen to be (how they become) *identical*...”**

2. The central proposition for dialectical logic on this point reads as follows: “...It is absurd to say that one cannot think in terms of

* “To transcend (*aufheben*) has this double meaning, that it signifies to keep or to preserve and also to make to cease, to finish” (*Hegel’s Science of Logic*, Vol. I, L. Allen and Unwin, 1929, p. 119).

** V. I. Lenin, *Collected Works*, Vol. 38, p. 109.

contradiction. The only correct thing in this statement is that nothing is ended by contradiction"* — contradiction *must be resolved*. This proposition firmly refutes the belief held by the numerous critics of Hegelian and Marxist dialectics that its procedure consists in seeking out contradictions and perpetuating them. Unfortunately, some Marxists share this strange and unfounded view on the grounds that both Hegel and the classics of Marxism did recognise the significance and fruitfulness of contradictions and demanded of scientists (and, above all, of themselves) the ability to *discover*, and not conceal, these contradictions. Since their main contribution to science was the analysis of social development, it mostly involved the uncovering of the contradictions in this development and, above all, the class contradictions. But anyone who has any knowledge of the works of Hegel and Marx should know that neither philosopher demanded the preservation and perpetuation of class contradictions. They demanded that these contradictions be *resolved*. Hegel, in the final analysis, saw the path to their solution in the *reconciliation* of opposites, whereas Marx, on the contrary, saw the solution in pushing the class struggle, this "struggle of opposites" in society, to the point of the revolution of the proletariat, the dictatorship of the proletariat and the building of communist society. This, of course, is not to say that Marxists recognise only one type of contradictions — irreconcilably antagonistic contradictions, and only one way of resolving them, by means of a revolutionary explosion. Any Marxist study of the problem of contradiction — and many have been written — testifies to this fact.

3. It was also Hegel in his preface to *The Phenomenology of Mind* who said that the true and the false are not independent entities, so that in the expression "in every case of falsity there is something true" they cannot be taken to be like oil and water, which do not mix and are merely united externally. "Precisely because we want to designate the aspect or moment of *complete otherness*, the terms true and false must no longer be used where their otherness has been cancelled and superseded. Just as the expressions 'unity of subject and object', of 'finite and infinite', of 'being and thought', etc., are clumsy when subject and object, etc., are taken to mean what *they are outside their unity*, and are thus in that unity not meant to be what its very expression conveys; in the same way falsehood is not, qua false, any longer a moment of truth."** This quotation vividly describes two aspects. The first is the statement that the combining of opposites, that is to say, the resolution of contradiction (true and false, and particularly A and $\neg A$ in the terminology of formal logic) is their *synthesis*, in which the initial statements no longer carry their initial

* G. W. F. Hegel, *Sämtliche Werke*, Bd. 8, S. 280.

** G. W. F. Hegel, *The Phenomenology of Mind*, London, New York, 1931, p. 99.

meaning. This situation, which for formal logic is quite unnatural, amounting in effect to a violation of the law of identity, is none the less a commonplace of contemporary science and contemporary philosophy. Known in Marxist literature as the “law of the transformation of quantitative into qualitative changes”, it recalls in some respects the English-speaking world’s concept of “emergent evolution”, according to which a new entity arising from the uniting of the initial elements is not only in a certain sense “greater” than the sum of these elements, but also that the elements themselves as part of this new entity undergo essential changes and become dependent on it. The acknowledgement of this thesis as applied to cognition ran into the difficulty that formal logic—this allegedly universal method of cognition—does not permit such a synthesis because it requires that the meaning of the conjoined statements should remain constant. Formal logic here is completely right, but only insofar as it proceeds from its own above-mentioned abstractions. Hence it follows that the cancellation of these abstractions demands a new logic, a dialectical logic.

The second aspect that has to be mentioned is the correlation of the true and the false, which in formal logic, as we have seen, is denoted in its most general form (in classical logic) as A and $\sim A$. Taken as such, they are simply “truth” on one side and “falsity” on the other. But this Manichean pair is not hypostatic in real life, in the real process of the development of knowledge, but is transformed into mutually opposed essences. The statement attributed to formal logic that the conjunction of opposite statements must be rejected as false on purely logical grounds emanates precisely from this Manichean position of metaphysics. “But let your communication be, Yea, yea; Nay, nay; for whatsoever is more than these cometh of evil” (Matthew, 5, 37). This position, of course, is possible, but only in elementary, extreme cases.

Another point besides this which deserves detailed consideration is the relationship between the Marxist solution of the problem and the Hegelian solution. It was no mere accident that I formulated the last two points precisely as they are presented in Hegel’s dialectic. When he asserted the identity of being and thought, Hegel experienced no difficulty in making the movement of thought accord with being. Because he, as Marx said, “came under the illusion of understanding the real as the result of thought that synthesises itself in itself, extends ever deeper into itself and develops out of itself”.^{*} Dialectical materialism builds a far more complex, profound and at the same time more accurate picture of human cognition assimilating the differentiated, ramified structure of reality, which offers our mind “strange”

^{*} Karl Marx, *Grundrisse der Kritik der politischen Ökonomie (Rohentwurf)*, 1857-1858, Moscow, 1939, S. 22.

dismemberments and ramifications, and “mad” combinations. These are *inevitably registered by this mind*, which carries the imprint of past experience, accumulated knowledge and habitual ways of thinking that have acquired the force of prejudice, *as formal-logical* contradictions that have to be eliminated “on purely logical grounds”

In contrast to this notion, dialectics, on the one hand, shakes such prejudices of the thinking mind by asserting the inexhaustible complexity of reality, which cannot be modelled on the pattern of the system of formal logic. For example, a system like the *Principia Mathematica*, which Russell and Wittgenstein at one time attempted to evolve. On the other hand, in contrast to absolute relativism, scepticism and irrationalist “dialectics” asserting the identity of dialectics and irrationalism, dialectics and mysticism, this system seeks a typology of the trains of thought enabling us to solve the contradictions most frequently encountered in science, to work out devices for solving these contradictions—always *relying* on the development of scientific knowledge and at the same time trying *to orient* science towards a search for a discovery of the real contradictions of its objects, the reflection of them in the contradictions of existing theories and their solution in the process of the formation of new theories.

This tendency today finds increasingly wide support among philosophers who subjectively do not accept dialectics and even “pity” the Marxists who themselves accept and recommend to others the Hegelian logic — “not merely obsolete but typical of pre-scientific and even pre-logical ways of thinking”* — as the basis for the study of scientific methodology. But the “turning upside down” of the Hegelian dialectical method, its transformation into a method of materialist dialectics, based on the theory of reflection,** deprives such “pity” of any rational foundation. And all the more important, I would repeat, is the implicit support expressed for our own view by such authors. Such support, even though negative, is to be found in Karl Popper’s *The Logic of Scientific Discovery* (1935, English translation 1959). The fundamental idea of this well-known work is that scientific discovery, this decisive moment in the creative development of scientific knowledge, does not take place by means of any formal procedures. Admittedly, Popper’s positive solution that “every discovery contains ‘an irrational element’ or ‘a creative intuition’ in Bergson’s sense”*** is indeed an example of that very “pre-scientific and even pre-logical” stage of cognition that is

* K. Popper, *Conjectures and Refutations*, New York, 1965, p. 335.

** Here we see yet another example of how the uniting, the synthesis of dialectics and the theory of reflection, usually regarded as an attribute of mechanistic materialism, yields something qualitatively new that cannot be reduced either to Hegel’s idealist dialectics or to the crude “theory of copies”

*** K. E. Popper, *The Logic of Scientific Discovery*, London, 1959, p. 32.

represented in the ecstatic intuition of the mystic, and whose kinship with Bergson's "creative intuition" has since been irrefutably established by the author of *Two Sources of Morality and Religion*.

Now let us take as another example *Foundations of Set Theory* by Abraham Fraenkel and Yehoshua Bar-Hillel. Here we read: "One may compare this function of the antinomies as controlling and restricting the deductive systems of logic and mathematics to the function of experiment as controlling and modifying the semi-deductive systems of sciences like physics and astronomy."* But whether one regards the antinomies as a disaster whose appearance perforce compels us to look for a different and safer basis, or as a (welcome) symptom of an illness that must be cured, in either case a solution requires "some departure from the customary ways of thinking..., though it is by no means clearly determined where this departure should take place".** It is such a "departure from the customary ways of thinking" that dialectical logic recommends.

It surprises no one today that the eminent logician and mathematician Alonzo Church should write that "the antinomies of set theory played an important role in the progress towards the ultimate solution, as it was the antinomies that forced the transition from the older naive and 'genetic' use of sets in mathematics to an axiomatic basis for set theory".*** But it is precisely antinomies that possess all the attributes associated with the dialectical contradictions of the theory we have described. They necessarily arise "on the borderline" of the previous theory and their solution yields a new theory, in which the antinomy of its predecessor is not removed, not cast aside as a mistake, but "cancelled", transcended, thus revealing its own creative power.

Examples could be easily multiplied, but "Ockham's Razor" suggests that neither essence nor example should be dwelt upon unnecessarily. All the more so that we have yet to analyse the various forms of resolving contradictions drawn from science. For the time being it may be assumed, I think, that we have established convincingly enough that the conjunction of two statements contradicting each other should by no means always be rejected as false, particularly on purely logical grounds. Such a conjunction may be the starting point of the progressive development of a concept (or theory) which will culminate in a new concept (or theory) synthesising the initial contradiction and "cancelling" it. In dialectics such development is called the "synthesis of opposites". We are now confronted with the question of how such development of knowledge is possible. How are opposites identical? How can they be identical?

* Abraham A. Fraenkel and Yehoshua Bar-Hillel, *Foundations of Set Theory*, Amsterdam, 1958, p. 19.

** *Ibid.*, p. 7.

*** *Proceedings of the International Congress of Mathematicians (Moscow—1966)*, Moscow, 1968, p. 16.

2. ON SOME OF THE WAYS OF SOLVING CONTRADICTIONS IN THE DEVELOPMENT OF SCIENTIFIC KNOWLEDGE

In the history of philosophy the problem of solving contradictions has been the subject of much attention. The dialecticians of Antiquity, Heraclitus and Zeno, Plato and Plotinus; the later ancients and the medieval mystics; Nicholas of Cusa and Giordano Bruno; Kant, Fichte, Schelling and Hegel; Benedetto Croce and Francis Bradley, the German neo-Hegelians and Nicolai Hartmann, Henri Bergson and the "dialectical theologians", from Kierkegaard to Karl Barth and Emil Brunner; Karl Jaspers and Jean-Paul Sartre—all these philosophers laboured to produce a solution to the problem. The main trends of their endeavours may be presented as follows: (1) The immediate contemplative reproduction of the "logic" of the unity of opposites in the directly given "eidos" or "image" of the universe expressed in Heraclitus' "It is wise to hearken, not to me, but to the Word, and to agree that all things are one" (2) Negative dialectics, which states that contradiction is the symptom of the unreality of the object expressed by a corresponding concept. The paradoxes of Zeno or "the questions of Milinda", and in more recent times the "dialectics of appearance" of Francis Bradley offer us plenty of examples. (3) The mystical dialectics of the neo-Platonists, the medieval mystics, and of Jacob Boehme, which evolved into the irrationalist interpretation of dialectics by contemporary irrationalism. As Jonas Kohn has aptly observed, the mystic hurls himself off the springboard of contradiction into the flux of the absolute and therefore does not resolve, but knows contradiction in his soul. The irrationalist sees in any contradiction that is fairly well established, evidence of the irrationality of reality and any knowledge of it, while he regards dialectics as the creation of "rational irrationalism" (Richard Kroner). Incidentally, in his heart of hearts the positivist who sees in contradiction a symptom of error and rejects it "on purely logical grounds" is in agreement with this. (4) The "positive" theological dialectics for which the contradiction of the finite and the infinite, the temporal and eternal, man and god is so fundamental that the only escape can be the universal "either/or" or, if you prefer it, in terms of faith, "I believe because it is absurd..." (5) The rational dialectics whose basic premise may be taken as the possibility, at least post festum, of tracing the actual ways of solving contradiction in the course of scientific progress, of creating a typology of such ways and recommending them as a heuristic instrument of scientific research. Such is the task of dialectical logic, of dialectics as Hegelian and Marxist logic and theory of knowledge.

A glance at our classification of the ways of solving the question as to how contradictions become identical reveals that most of them are

pre-scientific and even pre-logical ways of thinking, blind alleys of thought. These trends we, along with Sir Karl Popper, must reject, although study of the historical experience of the development of dialectics in such diverse forms as these can be most instructive. But *rational dialectics*, in our view, must be acknowledged and accepted as the most general methodology of scientific cognition, of *dialectical logic*. Naturally this essay is no place for a general description of the subject; we shall consider only some of the well-known scientific ways of resolving contradictions which lead to the formation of new concepts and theories, attempting as far as possible to discover their logical structure. These are all facts that are fairly well known to science and we shall do no more than consider them from a new angle.

1. Let us begin with the above-mentioned example of the rise of non-Euclidean geometries on the basis of the solution of the contradiction between the fifth postulate and its negation. With this great geometrical discovery scientific methodology, the "logic of science", acquired the vital proposition on the *relativity* of truth in the sense that the assertion and the denial of one and the same thing about one and the same thing may both be true if they are made in different systems. This was an important refinement of formal logic's law of contradiction, which had not previously assumed such a possibility. As other examples we could take the creation of the intuitionist and constructive logics involving the restriction of the law of the excluded middle; the Gödel-Cohen results in set theory, connected with the proof of the independence in set theory of the axiom of choice and the hypothesis on a continuum from the axiom of choice. "The Gödel-Cohen results and subsequent extensions of them have the consequence that there is not one set theory but many, with the difference arising in connection with a problem which intuition still seems to tell us must 'really' have only one true solution."*

Let us try to make a logical diagram of the solution of contradictions of this type.**

$$A \curvearrowright A \rightleftharpoons A \cdot \tilde{A} \rightleftharpoons S(A) \cdot S(\tilde{A}) \rightleftharpoons S(A) \cdot S(A_1) \cdot S(A_2)$$

* *Proceedings of the International Congress of Mathematicians (Moscow—1966)*, Moscow, 1968, p. 18.

** In this article, with the exception of the example from T. Kotarbinski's book, where it is more convenient to retain the author's own symbols, which are clear from his verbal description, we shall adopt the usual symbols of mathematical logic. The full point (.) is used to denote conjunction "and". The swung dash (\curvearrowright) before the symbol denotes its negation. The sign (\in) denotes inclusion in a class. The sign (\equiv) denotes equivalence, and ($=$) mathematical equality. In addition, we use the swung dash (\curvearrowright) over the symbol to denote definite negation and the sign (\rightleftharpoons) to denote cognitive implication ("if..., then...").

Logical and mathematical studies have shown that the necessary condition for solving a contradiction by means of building axiomatic systems based on alternative assumptions is that the assumption should be independent of the other axioms of the system.

2. Another example, also well known in logic, relates to the antinomy of “chance future events”, enunciated by Aristotle, which was solved on the basis of the concept of probability and probabilistic systems of logic only in the 1920s. In Chapter 9 of his book *On Interpretation* Aristotle investigated contradictory individual judgments about fortuitous (indeterminate) future events and reached the conclusion that they do not conform to the law of contradiction, as stated in formal logic. Indeed, from this law in its traditional form it follows that the truth of a statement implies the falsity of its denial. However, if you affirm the reality of a chance future event, the situation is quite different: your statement is not necessarily true, just as its denial is not necessarily true either. Neither one nor the other, taken separately, is true; only the antithesis as a whole, comprising both statements ($A \leftrightarrow \neg A$) is true. This reasoning of Aristotle’s gave rise to a controversy that has lasted for centuries. It has been either refuted on ontological grounds, by George Grote, for example,* or explained by redefining the meaning in which Aristotle used the terms “statement” and “negation”, which is said to be different from the sense in which they were used in his explanation of the law of contradiction.**

It seems to me that neither solution can be true because their only result is to modernise the views of Aristotle, but not to solve the problem which he posed. Aristotle himself drew the conclusion that about the fortuitous, or, as he put it in another passage, “indefinite possibility”, “there is neither science nor direct syllogism since the iron-bound middle term is absent”*** How sterile this conclusion was can be seen from the conclusion drawn from it that “probability is a mean between ignorance and knowledge which lacks nothing, that is to say, which evokes absolute certainty”****

This solution actually does exclude probability from mathematical study and places it firmly in the sphere of the subjective, and only the sustained work of mathematical thinking eventually recalled probability to the sphere of mathematics.

A genuine logical solution of the problem was presented in the work of the Polish logician Jan Lukasiewicz. In the 1920s he set himself the task of finding out whether it was possible to make three statements

* See G. Grote, *Aristotle*, Vol. I, London, 1872, pp. 164-68.

** See, e.g., A. S. Akhmanov, *Logicheskoye ucheniye Aristotelya (Aristotle’s Teaching on Logic)*, Moscow, 1960, pp. 151-56.

*** Aristotle, *Prior Analytics*, Book 1, Chapter 13, 32b.

**** G. J. Gravesande, *Introductio ad philosophiam, metaphysicam et logicam continens*. Ed. quarta, Leidae, MDCCLXV, p. 211.

containing modal propositions agree among themselves and with the laws of classical (i.e., two-valued!) logic. As expounded by Kotarbinski, they stand as follows: (1) $CN Mp Np$ (if p is impossible, then not p); (2) $CN pN Mp$ (if not p , then p is impossible); and (3) $\Sigma p KMp MNP$ (for a definite p , both p and not p are possible); this is equivalent to Aristotle's antinomy of chance future events. "The logical analysis made by Lukasiewicz," Kotarbinski writes, "demonstrates that the three propositions shown above cannot be stated without violating the laws of traditional logic."* Modification of the propositional calculus designed to achieve the possibility of asserting all these three propositions together produced the three-valued propositional calculus, which side by side with the truth-values "truth" and "falsehood" introduces a third logical value "indeterminacy", the negation of which produces the same indeterminacy — something that would have been inconceivable in two-valued logic, in which the negation of truth produces falsehood and vice versa, whereas in the latter case the negation of "indeterminacy" produces the same truth-value.

Now let us recapitulate the above analysis. Aristotle came to the conclusion that the law of contradiction is not applicable to chance future events since in this case affirmation of the truth of a thesis does not imply the falsehood of the antithesis. For example, when tossing a coin it is just as probable that it will come down heads as that it will come down tails. Consequently, the statement "the coin will come down heads" is equivalent to the statement "the coin will not come down heads" ($A \equiv \sim A$). Logic provides a way out of the situation by introducing the concept of probability (in the given case a $\frac{1}{2}$ probability) which "cancels" the contradiction, i.e., solves it. In this case from the formal contradiction $A \equiv \sim A$ one gets the cognitive contradiction $A \equiv \sim \bar{A}$, insofar as $\sim A$ and \bar{A} coincide only with a probability of $\frac{1}{2}$, when "will not come down heads" has the meaning of "comes down tails". In other conditions, for example, when throwing dice, the situation becomes more complicated because "not six" can be either one, two, three, four, or five.

The main thing is that thanks to the solution of this contradiction we must move out of the system of two-valued logic to which our reasoning has so far been confined into many-valued logic. Lucasiewicz's creation of three-valued logic meant that not all the tautologies of two-valued logic are tautologies in three-valued logic, including the law of contradiction and the law of the excluded middle.** This is not to say, however, that in three-valued logic the law of contradiction does not operate, or that a probable event cannot

* T. Kotarbinski, *Leçons sur l'histoire de la logique*, Warszawa, 1965, pp. 200, 201.

** See A. A. Zinovyev, "Ocherk mnogoznachnoi logiki" (A Survey of Multi-Valued Logic), *Problemy logiki i teorii poznaniya*, Moscow University Press, 1968, pp. 123-24.

be expressed uncontradictorily. Three-valued logic was constructed specially to accommodate without contradiction the expressions (1), (2), and (3) containing modal propositions. And this was achieved.

We must also note that in the given case there is a clear reflection of the actual process in the modal (probabilistic) process of thinking. The contradiction “cancelled” in thought by the concept of probability is resolved in reality by the making of a large enough number of tosses of the coin, which leads from the contradictory situation $A \equiv \sim A$ to the non-contradictory $nA = n \sim A$, in which n is the number of tosses.

Thus, the antinomy of chance future events discovered by Aristotle is resolved in probability logic and may be expressed in the formula: $A \equiv \sim A = A \equiv \bar{A} = MA \equiv \bar{M}\bar{A}$, where M is the sign of probability.

It is difficult as yet to say whether this formula may be extended to all the modal logics, or whether fresh difficulties will rise in this field.

3. Our third example is the ancient paradox of Zeno of Elea known as the “Flying Arrow” Its structure is usually presented so that the contradiction which it contains appears as the result of *analysis* of the concept of motion (or a moving body). However, its real meaning is revealed only if expounded conversely, that is to say, if the “flying arrow” argument is presented as *synthesis* of the concept of motion (or a moving body). This synthesis derives from the contradiction formulated in the words: “body A is located in place B and is not located in place B”. From the standpoint of formal logic this statement, or rather this “conjunction” of statements, is a contradiction and cannot therefore be accepted as comprehensible. As a rule, the formal-logical analysis of the paradox is made by refining the meaning of the term “is located” in the negative proposition on the basis of the fact that we already know that we are dealing with a moving body. But transference of the paradox from the analytical to the synthetico-genetical plane creates quite a different situation. Because we have as yet no concept of “motion” (or a moving body), we cannot perform the required refinements. So what do we do?

To achieve a solution to the problem we shall present the “conjunction” according to the truth-values it comprises and try to discover the corresponding empirical situations.

At one and the same time,	}	Body A is located in place B (true)	(1)
in		and	
one and the same relation		Body A is not located in place B (false)	

This situation, corresponding to the law of contradiction, denotes that if the negative statement is removed as false we have a fixation of the spatial location of body A in place B.

the meaning of the affirmative statement only verbally, whereas the negative statement is evaluated on the basis of the established fact of motion. But proceeding from the dialectical-logical interpretation of synthesis which we established above, we *have no right* to refine only one of the conjoined statements. The meaning of the terms in *both* statements must be determined out of an integral act of thought, which can be expressed as follows: "If body A is located in place B and is not located in place B, body A is moving." It then becomes clear that the fact that a body possesses a position in space (a moving body must be somewhere!) does not deprive it of its dynamic properties, and vice versa. The indefinite negation becomes a definite negation, and the statement and negation acquire completely identical meanings. In other words, in the affirmative statement the spatial position is clearly expressed and the dynamic characteristics are hidden; in the negative statement the reverse is true.

Symbolically the solution to the paradox may be expressed thus:

$$A \sim A = A \cdot \bar{A} \Rightarrow C(A \cdot \bar{A}) \Rightarrow C(A \cdot D)$$

The proposed solution to Zeno's paradox was presented in my work "The Flying Arrow and the Law of Contradiction" (*Philosophical Sciences*, No. 6, 1964). In 1967, in the book *Analysis of the Developing Concept*, V. S. Bibler published an interesting essay entitled "Genesis of the Concept of Motion (Concerning the History of Mechanics)" In the course of a detailed study of the genesis of Archimedes' mechanics, the author produces the following conclusion: "The development of mechanics (from Archimedes to the present day) derives from a solution of the real logical difficulties that were first formulated by Zeno of Elea or, to be more exact ... by Zeno and Aristotle. It is our view that the whole history of mechanics can (and should) be understood as the constant development of the answer to the Zeno-Aristotle question, as a kind of increasingly extended and concrete answer."* This work not only presents a historical scientific study confirming our hypothesis; it also reveals an aspect of the question that I have dealt with only in passing: the formation of a new theory is not one individual act that puts an end to the contradiction once and for all. In the course of the further development of knowledge the contradiction arises again and again and assumes new forms, while retaining its function as a motive force of the development of science.

Bibler has shown that the development of Archimedes' mechanics led to its destruction as a universal method and to its replacement by differential notions which made it possible to take into account and measure motion, still in a geometrical projection, as in Archimedes'

* *Analiz razvivayushchegosya ponyatiya (Analysis of the Developing Concept)*, Moscow, 1967, pp. 119-20.

mechanics, although no longer in integral form but in every point of the trajectory. This was supplied by the differential calculus, and it is all the more interesting that Zeno's paradoxes again occur here. Thus "Achilles and the Tortoise" are literally expressed in the antinomic situation that took shape in mathematics at the end of the 17th and the beginning of the 18th centuries, when the explanation of the differential calculus demanded the assumption of "actually infinitely small magnitudes", the essence of which was that they should represent both zero and not-zero simultaneously. And whereas Zeno had said that Achilles would not catch up with the tortoise, in the terminology of modern times this meant, "the variable will never reach a limit"

We find the simplest expression of the paradox of the differential calculus in the elementary expression:

$$\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x} = \frac{dy}{dx}$$

Since we know that the difference $\Delta y - dy$ is an infinitely small magnitude of a higher order than Δy , it is evident that dy is the limit of Δy , and dx is the limit of Δx . Thus the variables Δy and Δx tend simultaneously towards two limits, the first towards zero and to dy and the second towards zero and towards dx , which is contradictory.* Mathematics finds a way out of this situation in the modern theory of limits, which since the time of Weierstrass has replaced the use of intuitive notions of limit based on movement with the strict mathematical apparatus of inequalities. At the same time of great interest in this respect is Marx's idea that notions concerning actually infinitely small magnitudes giving rise to paradoxes should be replaced by the notion of the operative role of the symbols of the differential calculus.**

4. Marx's classical work *Capital* provides us with an example of conscious antinomic presentation of the problem and its solution. This we find in his analysis of the origin of capital. Marx formulates the problem as follows: "Our friend, Moneybags, must buy his commodities at their value, must sell them at their value, and yet at the end of the process must withdraw more value from circulation than he threw into it at starting. His development into a full-grown capitalist must take place, both within the sphere of circulation and without it. These are the conditions of the problem."*** As we know, Marx found the solution in the concept of labour power as a commodity whose use value possessed the property of

* See S. Y. Lurye, *Teoriya beskonечно malykh u drevnikh atomistov (The Ancient Atomists' Theory of Infinitely Small Magnitudes)*, Moscow, Leningrad, 1935, p. 17.

** See S. A. Yanovskaya, Introduction to the book *K. Marks. Matematicheskiye rukopisi* (K. Marx. "Mathematical Manuscripts"), Moscow, 1968, p. 10.

*** Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 163.

being a source of value, a commodity whose actual consumption is the materialisation of labour, that is to say, the creation of value, and whose circulation is consequently production.

The discovery of this concept, a vital one for the political economy of capitalism, involved an intricate process whose analysis goes beyond the scope of this essay. But in the most abstract form we have here a “conclusion” of the following type: capital arises in the sphere of the circulation of the commodity “labour power”, the very circulation of which is production. The solution of the contradiction comes about in such a way that it is “cancelled”, because the *circulation* of labour power is nothing else but *production* although, regarded intuitively, circulation and production are incompatible (in order to enter circulation a commodity must first be produced). Production therefore turns out to be a particular case of circulation (circulation of the commodity “labour power”). We must draw attention to the similarity between our reasoning and that which was conducted by Church in connection with the Gödel-Cohen results in set theory.*

Symbolically the “conclusion” may be presented as follows:

$$A. \sim A \Rightarrow A. \bar{A} \Rightarrow A \in \bar{A} \Rightarrow A \in P$$

Naturally, here too the result is formally non-contradictory.

We have examined and tried to interpret — without claiming to have been systematic or in any way comprehensive — some of the typical cases of the solution of contradictions that have resulted in the evolving of a new concept or system of concepts. They are encountered frequently enough in scientific thinking and they all have the same common feature that in no case are we dealing with the invariant, formal transference of thought. Each case presents an obvious movement towards a fundamentally new result.

This gives us reason to suppose that a large number of other procedures, usually regarded as formal, may be considered on the same plane. For example, such typical devices of mathematical logic for removing antinomies as the theory of types or the related procedure of logical semantics, which disposes of semantic antinomies by using metalanguages. This suggests that the very posing of the problem of antinomies and their elimination, despite the high degree of its formalisation in mathematical logic, leads us to an

* “The Gödel-Cohen results and subsequent extensions of them have the consequence that there is not one set theory, but many, with the difference arising in connection with a problem which intuition still seems to tell us must ‘really’ have only one true solution” (*Proceedings of the International Congress of Mathematicians (Moscow—1966)*, Moscow, 1968, p. 18).

awareness of the indivisibility of the form and content of thought and consequently to the discovery of its creative, synthetic character. Thus, the experience of modern formal logic gives in itself important material for dialectical-logical generalisation.

Dialectical logic, which consciously poses and solves the question of the development of knowledge, including that of how to solve contradictions, sees in the latter a procedure that cannot be expressed by means of formal-logical deduction, that cannot be formulated as an algorithm, a procedure whose various types may probably be established as specific forms of the shaping of concepts and theories, and raising them to a new and higher stage of development. In the resulting concept, or theory, the contradiction that has served as the initial point for such a development is “cancelled”, solved, and not formally removed. The systemisation, the concrete investigation and elaboration of the typology of contradictions according to the mode of their solution constitute a major task for dialectical logic.

A characteristic feature of the development of cognition by means of the solution of contradictions is that in the course of their solution leading to a new concept (theory) the content and meaning of the statements that form the initial contradiction are modified. Their final meaning can be discovered only when regarded from the standpoint of the whole train of argument, including both the initial contradiction and the result. So from the standpoint of the result achieved the initial contradiction loses the form of an abstract indefinite counterposing of thesis and antithesis (affirmation—denial), and becomes a specific, definite contradiction. Hence the initial contradiction emerges in the new system as something that fits into the non-contradictory logical formula whose structure is determined by the mode of solution adopted for the initial contradiction. However, any attempt to analyse the resulting concept (theory) in terms of the initial system inevitably leads to the reproduction of this contradiction.

It would seem, therefore, that there are sufficient grounds for extending to logical contradiction the principle of logical (semantic) relativity: a contradiction expressing the objective relations of things and events is correlative with the system of concepts in which it emerges. In the initial scientific system it may emerge in the form of a formal-logical contradiction; in the resulting system it will emerge in “cancelled”, resolved form. Whenever one is asked whether there is or there is not a formal contradiction in the case of the conjunction of a statement and its negation one must always ask in turn: “In what system?”

The problem of resolving contradictions as a means of evolving concepts, as a method of developing and transforming theories is a problem of dialectical logic that rests ultimately on the dialectics of objective processes. The investigation of this objective basis may proceed in two ways: through analysis of the natural scientific data

and through the study of the relations between the initial theories, on the “borderlines” of which one is clearly confronted with contradictions demanding solution, further advance, and with new theories arising out of the solution of these contradictions.

The absence of any general algorithm for solving contradictions, which is due to the non-formal and non-invariant movement of thought in the course of this process, often provides formal logic with grounds for criticising such a presentation of the problem. This criticism is based, however, on the identification of any antinomic expression of the $A. \sim A$ type with violation of the law of contradiction. Such identification is unjustifiable and does not take into consideration the specific abstractions of formal logic itself. It therefore fails to take into account the development of knowledge which, when the given formula expresses an objective contradiction, translates this formula into another, specific, definite contradiction of the $A. \bar{A}$ type. Nor does it take into account even the multi-valued nature of operations of negation discovered by modern formal logic itself.

The irrationalist philosophers see in the non-formal character of the solution of dialectical contradictions a symptom of the irrationality of this class of operations. For Kierkegaard “dialectical contradiction” is above all a “break” (Bruch), a “leap”, which “scandalises reason” and is therefore a “myth”.* For Bergson there is “something miraculous about it—since one does not understand how two contraries would ever meet each other ... like all miracles, it is or it is not...”; it is “a mysterious operation which takes place in darkness, and in regard to which ... one does not see how it would admit of shades or of degrees”.** For Jaspers it is a “breakthrough” (Durchbruch) that is “beyond all known rules”.*** But despite the deep opposition between them formal logic and irrationalism are united in denying the rationality of the process of solving contradictions. Extremes meet, as dialectics has always said. Neither formal logic nor irrationalism can solve the problem of integrative, synthesising thought.

In posing this problem dialectical logic studies the actual processes of scientific thought, the regularities to be found in the solution of contradictions. It cannot be stated a priori that this path promises us rapid success, and it is even more unlikely that it will be an easy path. But we must not forget that here we are dealing with one of the most profound mysteries of human thought—the mystery of the synthetic, creative activity of reason.

* Sören Kierkegaard, *Gesammelte Werke*, Abt. 16, 2. Teil, Düsseldorf, Köln, 1958, S. 281 ff.

** H. Bergson, *An Introduction to Metaphysics*, New York, London, 1912, p. 57.

*** K. Jaspers, *Von der Wahrheit*, München, 1958, S. 719.

Part Three

PROBLEMS OF THE THEORY OF KNOWLEDGE

D. P. GORSKY

SOCIAL PRACTICE AND SCIENTIFIC KNOWLEDGE

1. PRELIMINARY REMARKS

Social practice may be defined as collective (involving the coordination of joint efforts), sensuous (immediately verifiable), purposeful (and hence, related to the forecasting of its ultimate results, to volitional and evaluatory principles) material activity that people perform with the aim of changing, transforming the surrounding reality.

Practice takes place in experiment, in people's productive activity, in their activity designed to change the social reality. On the basis of social practice man does not simply change his natural environment, he creates a new social environment whose development and functioning obey laws which differ fundamentally from those of nature and cannot be equated with them.

The main factor in changing the social nature of man is labour, production activity. As Marx pointed out, people's nature "coincides with their production, both with *what* they produce and with *how* they produce".*

Thus, material production is production not only of a new social environment ("socium"), but also of new human needs. Man's social nature, his essence, which is a vital component of any production process, changes under the influence of the development of material production. In the process of labour designed to create new objects of the social environment the individual and mankind in general are constantly compelled to "go beyond" the limits of their previous nature, their previous quality. In perfecting production itself man perfects relations that are formed in the process of production activity. Material production, which is the basic and most important component of social practice, thus provides the source of the movement by which it moves itself and also society as a whole,

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, pp. 31-32.

insofar as all other spheres and strata of social life are in some measure determined by the level and objective logic of material production.

The structure of social practice, like the structure of other forms of human activity (and practice is a form of activity), presupposes the existence of (a) an object of activity; (b) aims of activity; (c) a motive of activity (which may sometimes coincide with the aim); (d) the result obtained (satisfying the aim or not); (e) the means and conditions for realising the activity in question, and also certain other secondary components. In each specific case the forms of activity constitute complex *systems* of interacting components (including interactions based on feed-back).

Practical labour activity is the basic, initial form of activity that ultimately determines all other forms. It differs essentially from these others in that its realisation always involves, first, the satisfaction of the most immediate and essential human needs, and, second, a type of satisfaction of essential needs that presupposes active alteration of the environment on the basis of use of instruments of labour and expenditure of physical energy, and also the coordination of the collective efforts of those taking part in production.

These two attributes taken together are sufficient to distinguish practical material activity from all forms of spiritual activity (scientific, artistic, religious, etc.), and also from the activity involved in educating the growing generation, and from play, or sporting and other forms of activity. The basic character of practical activity stands out particularly if we take the historical, genetic approach in studying it.

As we know, labour, productive activity originally included in a subordinated form elements of other kinds of activity. In the process of historical development these kinds of activity (including scientific theory) gemmed from production activity and acquired a relative independence.

Criticising Adolf Wagner, Marx demonstrates that people never begin by assuming a theoretical attitude to the objects of the external world. They begin by being active, by taking action to gain the mastery over certain objects of the external world and thus satisfy their needs. This means that they begin with production.

“Thanks to the repetition of this process the ability of these objects to ‘satisfy people’s needs’ becomes imprinted in their minds; people and animals learn ‘theoretically’ to distinguish external objects that satisfy their needs from all other objects. At a certain stage in their further development, when people’s needs and the forms of activity by which they satisfy them have multiplied and advanced, people give names to whole classes of these objects, which they have now learned by experience to distinguish from the rest of the external world.... But this lingual naming merely expresses in the form of represen-

tation that which repetitive activity has converted into experience.”*

But having generated various kinds of spiritual activity, labour activity does not abandon them to the whim of fate. It continues to “patronise” them; it influences them (either directly or through a complex network of social relations) by means of prohibitions and inducements that guide these forms of spiritual activity towards the solution of problems raised by the development of social production, by social practice.

Practice as material activity arose together with man as a social being. In its categorial meaning, however, it was understood only by Marxism, where it became the most important element of the dialectical-materialist world-outlook, the basis of the materialist understanding of history, the basis for the transformation of the world.

Social practice as a category is used for the apprehension and explanation of all kinds of different aspects of social life, their various connections, determinacies and mediacies.

In this article we shall be concerned with only some aspects of the relationship between practice and scientific cognition. We shall show that by bringing practice as a category of Marxist-Leninist philosophy into the theory of knowledge we are able to solve scientifically many problems connected with the identification of the stimuli of scientific development, the testing of our knowledge, and the processes of its formation and systemisation.

2. THE WELL-SPRINGS OF NEW KNOWLEDGE

The dividing lines between pre-scientific (everyday) and scientific knowledge are not rigidly definable. What is more, they have ever been subject to historical change. Pre-scientific knowledge was to be found in its more or less “pure” form only in the period when science had not yet emerged as a special form of social activity. An important advance in this period was the formation of “rules of thumb” (prototypes of the laws of science), based on generalisation of empirical experience. These rules described some of the algorithms for solving the problems involved in satisfying man’s immediate needs; they prescribed the sequence of actions required in using certain primary objects in order to achieve certain desired results. They contained recommendations on how, for example, to make fire, how to fashion a certain kind of tool, how to cut up the carcass of an animal that had been killed, etc. These rules took shape in the course of social practice. They were generalisations of those “lucky” finds and actions that were registered in the process of material activity designed to satisfy man’s essential needs.

* Marx/Engels, *Werke*, Bd. 19, Berlin, 1962, S. 363.

As we know, the emergence of science as a special form of activity was connected with the division of society into antagonistic classes, with the separation of mental work from physical labour. The appearance of science in its turn involved delimiting the sphere of the experience already acquired by man, including that acquired by means of science, and the sphere of purely scientific activity designed to multiply and perfect the aggregate social experience. Acquired experience was registered by means of language and passed on from generation to generation by means of education and training. The assimilation of this acquired experience became a condition for successful research as such and the systematic study of nature.

Analysis of the history of scientific knowledge convinces us that its development occurs under the influence of two basic stimuli. The first stimulus is the needs of social practice, the needs of social production and its achievements. We know that already the ancient Greek philosophers ascribed the birth of geometry in Egypt to the fact that every year the Egyptians had to restore the boundaries of their plots of land after they had been obliterated by the flooding of the Nile. Marx noted that "the sporadic use of machinery in the 17th century was of the greatest importance, because it supplied the great mathematicians of that time with a practical basis and stimulant to the creation of the science of mechanics".* The development of the techniques of clock-making, ballistics, and hydraulics also stimulated progress in the corresponding fields of mathematics in the 17th century. In 1673 Huygens, one of the inventors of the pendulum clock, published his famous book *Horologium Oscillatorium*, which combines the study of design with the elaboration of new methods of mathematical research. This stimulating influence of technology on mathematics, on the direction of its research, still continues to this day. Research on the steam engine, particularly that of Carnot, laid the foundations of modern thermo-dynamics. Advances in scientific instrument-making and machine-building currently provide an important stimulus to the creation of new scientific disciplines, as demonstrated by the role of electronic microscopes, accelerators of "elementary" particles, and instruments based on the principles of radioelectronics.

Sometimes the needs of practice function as direct social assignments addressed to certain individual scientists or research teams. According to the historians of sciences, Hiero II, the tyrant of Syracuse, set Archimedes the task of discovering whether his crown was made of pure gold or not. Archimedes' performance of this task, in the opinion of some of them, led to the birth of a new science—mathematical physics. The theory of probability, as we know, was also advanced by the development of gambling and insurance.

* Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 329.

Technical achievements often confront science with the need to make a more comprehensive study of nature. "Technical progress," writes Academician Y. K. Fyodorov, "compels us to take into consideration more and more subtle features of natural processes.... The flights made by the unsophisticated aeroplanes of forty years ago depended to a great extent on the weather. But their needs were satisfied by a very primitive understanding of weather-forming processes and very simple data concerning the state of the meteorological elements in the lower, 300-500 meter, layer of the atmosphere. These could be provided by observations from the ground. The modern aeroplane can fly in almost any meteorological conditions. But it requires far more detailed and frequent information on the weather and this must be gathered over the huge range covered by the flight distance."*

It must be noted, however, that the scientific problems brought to light by practical needs only yield the desired result when the scientific means are available for their solution. For instance, society has long since been asking scientists for an effective means of combating cancer, or providing more accurate weather forecasts, and so on. But science today still lacks the necessary potential to deal with these problems completely and the social assignment remains unfulfilled.

The second stimulus to the advance of scientific knowledge lies in the inner logic of the development of science itself. A large number of new scientific results are obtained through the purposeful study of facts discovered by observation or experiment (if we are talking about the experimental sciences), through the discovery of certain regularities in the relationships between abstract objects (as is often the case in mathematics).

Ever since it began, science has been studying problems whose connection with the immediate satisfaction of man's needs (and any utilitarian needs in general) is difficult to observe. Indeed, the very first philosophers of ancient times often stressed the value of the scientific result in itself.

Aristotle tells us that Thales, for instance, who lived more than six centuries B.C., made a forecast of a good harvest of olives on the basis of astronomical observations and logical reasoning.

In the process of the development of science the elucidation of new facts and their study often lead to genuine revolutions in science and technology, although neither their utilitarian nor their purely scientific significance was apparent at first.

When Faraday after his famous experiments on electromagnetic induction was asked: "What is the use of this discovery?" he answered: "What is the use of a child—it grows to be a man."

* Y. K. Fyodorov, "Nekotoriye problemy razvitiya nauk o zemle" (Some Problems of the Development of the Science of Earth), *Voprosy filosofii*, No. 11, 1962, p. 66.

Faraday's "child" became a genius. His discovery in the field of electromagnetic induction provides the bedrock of all modern practical applications of electricity and magnetism.

While Faraday's discovery, which was related to experimental practical activity but at first had no utilitarian motives or aims, subsequently acquired tremendous practical importance, the discoveries of Leonhard Euler in the sphere of the theory of numbers were never directly applied in practice. But this in no way detracts from their significance; they played an enormous part in the development of mathematics itself, in perfecting its methods and, particularly, in the development of the mathematical disciplines that are now of such tremendous practical importance.

The history of science shows that the role and influence of the above-mentioned sources and stimuli have differed in different historical periods. Whereas in pre-scientific times the basic source of the multiplication of social experience was practice, man's activity in satisfying his immediate needs, the preservation and prolongation of his life (practice was the source of knowledge in the literal sense of the word), today the connection between knowledge and practice is becoming mediated. This indicates a constant increase in the proportion of anticipatory forms of the reflection of activity compared with the direct forms, although in the epistemological sense the latter continue to remain the foundation for the anticipation of reality and practice.

On the other hand, it seems to us that practice as the criterion of truth is acquiring an ever increasing fundamental significance in that it is the basic means of controlling the development of scientific knowledge, which reaches far ahead of anything we know in reality. Moreover, practice as the criterion of truth should not be interpreted crudely, that is to say, in the sense that every scientific proposition must be applied in practice and be confirmed by practice. In the process of substantiating the propositions of science we make use of many methods of their indirect comparison with reality (logical proof, the principles of correspondence, of simplicity and non-contradictoriness, the devising of models satisfying formal systems, rules for the reduction of the complex to the simple, etc.) which are only ultimately linked with practice. The intrinsic laws of development of the fundamental sciences give rise to fields of knowledge that cannot in principle be put to practical tests. Nonetheless they are eventually applied in disciplines that do permit of practical application. In scientific apparatuses and disciplines we may encounter symbols that have purely auxiliary functions, even though they permit of interpretation in scientific terms that already have their correlates in objective reality. Such, for example, are imaginary numbers. Engels drew attention to this aspect of the problem. He pointed out that these numbers had been discovered in a different way from that

which had led to the evolution of the natural numbers. Whereas the latter had been obtained by means of abstraction on the basis of operations with the objects of the external world, imaginary numbers had emerged as products of “the free creations and imaginations of the mind itself” *

3. LOGIC AND PRACTICE

It is a commonplace to say that logic plays a big part in scientific cognition. Logic is used for explanation, forecasting, substantiation, proof and the systemisation of our knowledge. It is an important instrument for the anticipatory, creative reflection of reality.

The question therefore arises whether the laws of logic are pure conventions or whether they have an objective basis in reality itself and in our practical activity. Dialectical materialism regards the laws of logic not merely as rules of a conventional nature, nor as rules related to the use of language, but as an extremely broad and mediated generalisation of practice, of activity, above all cognitive activity, which is closely connected with practice and designed to further our knowledge of reality. In this connection Lenin wrote: “...The practical activity of man had to lead his consciousness to the repetition of the various logical figures thousands of millions of times *in order that* these figures *could* obtain the significance of axioms.”**

Logic is often regarded as something that provides us with no information about the world. Such an abstraction is quite permissible when we consider logic in terms of its use in certain special systems and proofs. It is a fact that a certain sentence denoted as A may be proved through the application of *different* logical tools while remaining one and the same sentence, because the different logical tools that are used to prove it do not change its content. However, if we take a broader epistemological and methodological approach in defining the status of the laws of logic we have to acknowledge that they do carry a certain amount of information (though it may be minimal) about reality. Otherwise it would scarcely be possible in any natural way to substantiate the productive use of the laws of logic in the process of cognition and assimilation of reality, to substantiate the fact that they cannot be entirely arbitrary but must lead (as, for example, in the process of deductive proof) to the formulation from certain true statements of other true statements, in other words, establish the necessity of non-contradictoriness.

It is thanks to this objective character of the laws of logic that we are able to make such wide and confident use of them in the anticipatory reflection of reality, in our mental “playing back” of various hypothetical situations in the search for truth.

* Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 49.

** V. I. Lenin, *Collected Works*, Vol. 38, p. 190.

Let us suppose that we are considering the nature of cancer as a disease. We may take the following assumptions as our premises: "All virus diseases (in certain circumstances) are infectious." "Cancer is a virus disease." From these two premises the rules of logic (in this particular case, the rules of syllogism) would allow us to draw the inference: "Cancer is infectious." If the premises are true, then the inference must also be true. Now let us suppose that we have begun to doubt the truth of our premise, "Cancer is an infectious disease." Then in accordance with the deductive method we can from the single premise "All virus diseases are infectious" also obtain a true inference but now only in an implied form: "If cancer is a virus disease, it must be infectious." Now let us suppose that we have doubts about the truth of the first premise as well. Still the method of deduction allows us to draw from an indeterminate set of premises a true inference that has a more complex implied form: "If all virus diseases are infectious and cancer is a virus disease, cancer must also be infectious." When formalised, such a statement turns out to be a logical tautology.

In order to obtain anticipatory reflection (for example, to test the truth of certain statements) we sometimes introduce statements that are known to be false but which are afterwards eliminated (for instance, in the rule of contraries).

It is notable that when we perform the abstraction of identification upon a certain group of objects we can afterwards prove certain theorems concerning them on the basis of only one specimen of the group as long as we refer only to the properties from which the abstraction was made. This will be so even if the number of objects in the group is infinite. What we have just said follows from the logical rule known as Locke's rule:

$$\frac{P(a)}{\forall x P(x)}$$

This rule may be stated as follows: "If any fixed element a of a certain class is known to possess the property P , this property must belong to all elements of that class."

It is a fact that we can prove the theorem of the sum of the angles of any triangle on the basis of one abstract triangle since in this case we are taking into account only those properties of the triangle that are laid down in its definition (we disregard its other characteristics, such as the length of the sides, the size of the angles, its area, etc.). Once we have made this abstraction, all triangles become indistinguishable and can be identified as a single abstract object. Therefore the theorem that any triangle possesses the property P can be proved once and with a single diagram.

Now let us formulate the basic relationships of logical proof as a means of substantiating the truth of statements and establishing practice as the criterion of truth.

1. The rules of logic (in the case of classical logic) are constructed so that from true propositions only true propositions may be obtained. There is no need for practical testing of a proposition, even when this is quite easily done, because the proposition may be inferred by application of the rules of logic from propositions the truth of which is well established. This use of anticipatory, mediated means of cognition accelerates the development of knowledge and enhances its heuristic potential.

2. In cases when the criterion of practice is extremely difficult or fundamentally impossible to apply (when we have to test statements about past events, for example), logic performs an invaluable service for knowledge. It is then proved by logic that situation A, to which the criterion of practice can either not be applied or applied only with the greatest difficulty, may be replaced by another situation B, which is a directly perceptible situation to which the criterion of practice may easily be applied. Situation B often occurs only in an experiment, i.e., in circumstances which in turn presuppose practical activity. Study of situation B enables us by using the rules of logic to draw certain reliable conclusions about situation A. For example, it is impossible to apply the criterion of practice to the objects of the microcosm. So, instead of studying these objects, we study experimental situations that bear a relation to the phenomena of the macrocosm. By analysing the readings of instruments which are by nature macroscopic, we can draw conclusions about the properties of microcosm objects.

On this subject S. A. Yanovskaya writes: "The essential point, however, is that mathematical rigour, and logic in general, widen the range for the application of the criterion of practice, enable us to replace its application in cases that cannot be practically tested, by application to cases that can. In fact we have to do this continuously when, for example, we are trying to reproduce the past on the basis of currently surviving evidence that can be tested experimentally, in practice. Whether we want to find out the chemical composition of a star from its spectrum or make a diagnosis on the basis of an X-ray picture or whatever the case may be, we are always using logic to replace the application of the criterion of practice in difficult and complex situations by its application in less complicated ones. Moreover, the 'simplicity' of these cases lies in their amenability to direct practical testing and therefore depends on the technical possibilities at our disposal...."*

* S. A. Yanovskaya, "O roli matematicheskoi strogosti v istorii tvorcheskogo razvitiya matematiki i spetsialno o 'geometrii' Dekarta", *Issledovaniya logicheskikh sistem* (The Role of Mathematical Rigour in Creative Development of Mathematics and Particularly Descartes' "Geometry", in the book *Study of Logical Systems*), Moscow, 1970, pp. 47-48.

4. SOCIAL PRACTICE AND THE FORMATION OF CONCEPTS

Since any detailed examination of this problem is beyond the scope of the present article, we shall confine ourselves to considering the role of social practice in the formation of abstract concepts, taking as our examples the concept of value (fundamental to political economy) and the concept of number (fundamental to mathematics). This will lead us to the conclusion that the formation of abstract fundamental concepts and their definition are determined by the level of development of social practice, that practice is the basis for abstracting the sensuously imperceptible properties of objects.*

The concepts we have chosen to consider are formed by means of the equality-type relationship.

Equality-type (R) relationships are relationships possessing the logical properties of reflexivity, symmetry and transitivity. In other words, these are properties that simultaneously satisfy the following axioms:

1. xRx
2. $xRy \rightarrow yRx$
3. $xRy \wedge yRz \rightarrow xRz$

where the sign \wedge denotes conjunction ("and"), and the sign \rightarrow denotes condition ("if..., then...").

Axiom 1, that is to say, the axiom of reflexivity, states that any object x of a given class is in R relationship to itself.

Axiom 2, i.e., the axiom of symmetry, states that if any object x of a given class is in R relationship to object y , then object y is also in R relationship to x .

Axiom 3, i.e., the axiom of transitivity, states that the following relationship holds good for any objects x , y , or z . If x is in R relationship to y , and y is in R relationship to z , then x is also in R relationship to z .

Certain specific relationships satisfy our axioms, that is to say, produce true statements if substituted for R, while others do not satisfy these axioms.

Thus, the relationship '=' does satisfy our axioms because $x=x$ is true (for example, any number is equal to itself); $x=y \rightarrow y=x$ is also true (for example, if the number x is equal to the number y then the number y is also equal to the number x); $x=y \wedge y=z \rightarrow x=z$ is also true (for example, if the number x is equal to the number y , and the number y is equal to the number z , then the number x is equal to the

* There are properties that cannot be revealed in individual material objects either by perception or even by the use of instruments. In this connection Marx pointed out that, when analysing such economic categories as value, "... neither microscopes nor chemical reagents are of use. The force of abstraction must replace both" (Karl Marx, *Capital*, Vol. I, Moscow, 1975, p. 19).

number z). These axioms are also satisfied by such relationships as the “simultaneous” (in relation to events), the “similar” (in relation to geometrical figures), “may be exchanged for” (in relation to commodities), the “equal in number to” or “is in the state of one-to-one correspondence” (in relation to various sets of objects), and so on.

Other relationships (for example, $<$, $>$, or “being a father to”) do not satisfy these axioms and therefore are not relationships of the equality type.

Thus, relationship $<$ does not satisfy axiom 1 or axiom 2, because the statements that “every number is less than itself” or that “if $x < y$, then $y < x$ ” are false.

* * *

Now let us consider the process of the formation of the concept of value, one of the fundamental categories of political economy. The discovery of the essential nature of this concept belongs to Marx. In the first chapter of the first volume of *Capital* Marx shows how “value” as a property of a commodity can be identified. To elucidate this question he first of all analyses the exchange of commodities. He points out that the property of value can be abstracted only by examining the relationships entered into by commodities when they are exchanged. In the process of exchange commodities are made equal with each other despite their different qualitative characters. This gives rise to the question as to what is the common factor that allows us to establish a relationship of equality between two commodities that are absolutely different in their qualitative characteristics.

In his works *Capital* and *A Contribution to the Critique of Political Economy* Marx examines this question in detail and shows that the “third” factor that makes it possible to establish a relationship of equality between two quite different commodities is their value.

“Therefore,” Marx writes, “the common substance that manifests itself in the exchange-value of commodities, whenever they are exchanged, is their value.”*

Investigating the question of how logically to explain the appearance in science of the concept of value, Marx at the same time shows the historical origin of the abstraction of the property of value and how it was formed, what the general conditions were for the formation of such a concept in the process of cognition of surrounding reality. It is only possible to identify a new property of which we had previously no knowledge by discovering and analysing certain relationships (relationships of the equality type (R) that exist between

* Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 46.

the objects under investigation. These relationships are distinguished by the fact that they are *immediately related to human practical activity*, directly involved in this activity. Thus the isolation of the property of value became possible only when man began to exchange commodities, in other words, when he began to realise *in practice* the relationship of exchangeability (R) between commodities. The fact that all commodities, exchanged for one another in certain proportions, have something in common could be discovered only when exchange had become highly developed, when it was clear that any commodity could be exchanged for any other commodity in a certain proportion, when it was realised that the relationship of exchange was an equality-type relationship, i.e., satisfies axioms 1 to 3 mentioned above. This became possible only when a universal form of value had become dominant, when a certain quantity of a commodity figured as the equivalent in exchange of all other commodities (i.e., at a certain stage in the development of social practice).

Marx considers the sequence of the forms of value in their *historical* development and shows that the development of these forms is nothing else but development of the forms of exchange of commodities. It was only by investigating how the forms of value developed in the process of the development of social practice that it became possible to arrive at the logical generalisation that in all commodities that are exchanged there must be something in common. Marx observes that this common property of value could be discovered only at a certain stage of historical development. "Although an abstraction," he writes, "this is an historical abstraction which could only be evolved on the basis of a particular economic development of society."*

And it is quite true that in the conditions of the simple, individual or accidental form of value (when a certain quantity of one kind of goods is accidentally exchanged for a certain quantity of another) no such conclusion could have been reached. It could not have been reached, first, because of the limited number of commodities involved and, second, because in the absence of any broad market, any systematic relations between clan or tribal communities, commodities were exchanged as a rule (and not as an exception) in all kinds of quantitative proportions, often quite unexpected ones (axioms 1 to 3 would not be obeyed here for all commodities). Under such conditions one could draw the conclusion that the ability of some commodities to be exchanged for others is an ability belonging only to certain qualitatively different commodities, and that the numerical proportion between the commodities exchanged depends not on the commodities themselves but on the luck or cunning of the people involved.

* Marx, Engels, *Selected Correspondence*, Moscow, 1975, p. 98.

In the context of the developed form of value one still cannot draw the conclusion that all exchangeable commodities have something in common. At this stage the universality of the relationship of exchangeability of commodities has not yet appeared. The state of commodity exchange allows us to infer that certain quantities of certain commodities may be exchanged for other commodities taken in a certain numerical proportion.

In this situation a clan or tribe that has specialised in the production of a certain commodity can exchange it for any other commodities in which it is interested. But such a state of exchange still gives no grounds for concluding that any commodity in general can be exchanged for any other commodity in a certain quantitative proportion (in this case axioms 1 to 3 are still not obeyed for all commodities and consequently there is still no complete universality of the relationship of exchangeability (R)).

This conclusion can be reached only when exchange in its development achieves the stage of the *universal* form of value. At this stage the equality relationship becomes *universal* in the exchange of commodities, that is to say, it becomes clear that any commodity may be exchanged on an equivalent basis, in various quantities, for any other commodity (moreover, any commodity may be taken as an equivalent). Here axioms 1 to 3 are obeyed for any commodities taken in a certain proportion.

As soon as we are able to infer on the basis of a factual investigation that all commodities may be exchanged for each other in certain proportions, we can draw the conclusion that there must be something *in common* between them (in the process of exchange we are equating qualitatively different commodities thanks to the existence of this common substance). The common property thus revealed is given the name of "value"

It must be noted that by the means described above one can only identify a definite property. One still cannot reveal its essential nature. The identifying or abstracting of a new property in any object of study does not yet mean that we have discovered the essential nature of that property.

Nevertheless the process of forming a concept is bound to include the stage of abstracting this property, isolating it from a number of other properties. The nature of the property that we succeed in identifying is a different question, depending on the further development of our knowledge of that particular property, our ability to define the concept that has thus been formed.

At this stage of the formation of the concept of "value" we can define value only as an "abstract object", as a general feature of commodities that are exchanged for one another. In this connection Engels writes: "Marx summarises the actual content common to things and relations and reduces it to its general logical expression.

His abstraction therefore only reflects, in rational form, the content already existing in the things.”*

Marx notes the genius of Aristotle, who was able to discover the common substance in goods that are exchanged for one another. “The brilliancy of Aristotle’s genius,” Marx points out, “is shown by this alone, that he discovered, in the expression of the value of commodities, a relation of equality.”** But Aristotle could not reveal the nature of the common property he had discovered. This was due to the level of development of social relations, of social practice, as it was in the time when Aristotle lived. “The peculiar conditions of the society in which he lived,” Marx writes further, “alone prevented him from discovering what, ‘in truth’, was at the bottom of this equality.”***

It was Marx who discovered the nature of this common substance. He showed that value is nothing else but the embodiment in a commodity of human labour, the quantity of which is measured by socially necessary working time. It became possible to discover the essence of value only in the conditions of capitalism, when the equality and equivalence of all forms of labour were revealed. when the dominant social relationship between people became their relationship as commodity owners, when the producers were finally separated from the means of production, and labour power became a commodity.

Now we must analyse the formation of the concept of number.

The concept of number is one of the most fundamental concepts of science. Although the study of number is the province of mathematics, we make use of numbers and operations with them in all spheres of social life. It may be said without exaggeration that no science at its present stage could be developed without some use of numbers and operations with numbers, not to mention all kinds of practical activities. It is therefore particularly interesting and particularly important to discover the origin of the concept of number and how it grew up. The importance of this question is enhanced by the fact that idealism has used, and is still using, the concept of number, its character and origins, in its attempts to criticise and overthrow materialism in philosophy, to disprove the theory of reflection by speculating on the weaknesses and limitations of the pre-Marxist metaphysical materialism. The essential point of many idealist notions of the origin of natural numbers is that the concept of natural number cannot be explained out of experience, that man masters the idea of number before any experience (a priori conceptions) or that number is a result of free creativity (neopositivism).

* Marx, Engels, *Selected Correspondence*, p. 357.

** Karl Marx, *Capital*, Vol. I, Moscow, 1974, p. 66.

*** Ibid.

The concept of number is an extremely broad abstraction. The concept of the natural number, for instance, reflects only the quantitative character of sets of objects. In forming the concept of a number we ignore all the qualitative characteristics of the relevant set of objects. Thus, for example, the same number "5" may describe a quantity of any kind of object: apples, flowers, towns, senses, countries, etc.

First let us consider how we can logically picture the process of the formation of the concepts of different numbers and the concept of number in general, and then we shall discover that the logical process thus described reflects a historical process, that it is determined by social practice.

Suppose we have at our disposal a set of five objects. In order to abstract the properties characterising the numerical aspect of our set, and at the same time form the number "5", we must place the given set in a certain relationship to other sets, i.e., identify all the sets that are equal to our set. This is not difficult to do without actually counting the elements of each quantity.

It can be done by establishing between the sets a one-to-one correspondence (i.e., an equality-type relationship satisfying the axioms 1 to 3) that is realised in man's *immediate practical* activity. The one-to-one correspondence may be illustrated by the following example. If we know that all the people in a room are sitting on chairs and that there are no vacant chairs in the room, this means that the number of chairs and the number of people in the room are in a one-to-one correspondence. If such a correspondence exists between sets, it means that they are *equal in number*. If, for instance, we know that all the seats in a cinema are taken and that there are no members of the audience without seats, then without knowing the number of the audience in the cinema or the number of seats, we can assert that these two sets (audience and number of seats) are equal in number.

The relationship between the sets M and N is a one-to-one correspondence relationship if (and only if) any element of the quantity M may be correlated with any element of the quantity N and vice versa, including different elements of either of the two quantities.

To determine the number of elements in set A, to discover the numerical aspect of this set, it is necessary by establishing one-to-one correspondence to select from all the available sets those equal in number to set A. Suppose set A is equal to the number of fingers on a man's hand, to the number of letters in the word "table", to the number of sides in a pentagon, and so on. It is obvious that the common factor existing in all these qualitatively different but quantitatively equal sets will be the quantitative characteristic of set A and each of the sets that are equal to it in number.

Thus the quantitative characteristic (property) of set A acquires a definite name or designation, a definite material envelope, which in the given case is designated by the figure 5.

The common factor that exists in all the sets that are equal to one another in number will obviously be number in general.

It was the discovery of the property of number that gave rise to the emergence of mathematics as a science, and made possible the development of the concept of number.

The actual formation of the concept of number (like the concept of value) passed through several stages.

We have shown that the identification, the abstraction of the property of value became possible only at the stage in the development of social practice when exchange of commodities began to take place as the universal form of value. The concept of numbers could arise likewise only at that stage in the development of counting when a certain set or quantity emerged as a standard reflecting by means of one-to-one correspondence all other correlated sets or quantities.

At first the correlation of these sets was of a purely accidental nature. The set which had to be counted was brought into a one-to-one correspondence with another set that was *temporarily* accepted as a standard. The correlated set displayed its quantitative characteristics when checked against the given standard. It was impossible from such a comparison of the two sets to determine its numerical quantity but it was possible to determine whether the set in question was equal to the set that had been taken as standard, or not equal to it, whether it was larger or smaller. Such counting operations must have been used by the ancient Greeks.

As the needs of counting developed, one and the same set might be expressed in many other standard sets. This made it possible to express the quantitative magnitude of the set more fully. The further development of counting, determined by the development of man's social practice, resulted in certain sets becoming the standard sets by which the quantitative magnitude of any other set could be assessed, since they embodied the quantity of any other set. Such basic standard sets were the fingers of a man's hand or toes of his foot, with which *all other* sets or quantities were compared according to their quantitative magnitude.

While the standard set used for establishing a one-to-one correspondence was chosen completely at random, it was still impossible to infer that all the compared sets had something in common, independent of the qualitative characteristics of the objects they included, this something, this common property, being the "possession of a certain quantitative characteristic" It could turn out that the common factor that was discovered in establishing one-to-one correspondences between sets belonged only to the given sets that

were being compared and no others. In other words, at this stage the axioms 1 to 3 were not satisfied for all sets of comparable power.

When it was noticed that one particular set turned out to be equal in number to the elements of several other sets, when, for example, the number of fingers on one hand turned out to be equal to the number of members in a certain family, the number of apples on a tree, etc., it was no longer possible to suppose that the two sets which had been compared were equal in number owing to accidental circumstances. The analysed set turns out to be equal in number to many other sets. This corresponds to the developed form of value in the formation of the concept of value. Consequently, in every pair of numerically equal sets (fingers and apples, fingers and members of a certain family, etc.) there exists something necessary, and not accidental, something general that allows us to establish a one-to-one correspondence between them.

But even at this stage in the development of counting it is still not possible to infer that any set that is in a one-to-one correspondence with a standard set (in the given case with the number of fingers on one hand) can in its turn express the number of any other set that is in a one-to-one correspondence with the given standard set. The (R) relationship has not yet acquired the character of universality.

This is discovered at the stage of the development of counting operations when it becomes known that all the sets (sets of apples, family members, etc.) are equal in number to the fingers on one hand.

In this case each of the sets between which it is possible to establish a one-to-one correspondence may represent the number of any other set that is equal to it in number. Axioms 1 to 3 are here satisfied for all sets in the (R) relationship. This is how the property of "having a certain number" is abstracted. The common factor that exists in all sets of sets between which a one-to-one correspondence (R) can be established was seen to be the general property of "number"

After this it was possible to count all correlated sets of objects by bringing them into a one-to-one correspondence with certain signs denoting numbers.

Whereas the establishing of a one-to-one correspondence between two unordered sets of objects allowed us to discover whether they were equal or whether one contained more or less elements than the other, the establishment of a one-to-one correspondence between two sets one of which is ordered allows us to define exactly its power, i.e., its property of "having a certain number". The above statement means that the concept of number may be deduced from experience if one approaches this question historically, dialectically, if one starts off from the concept of socio-historical practice. And it is this which overthrows the above-mentioned conceptions of idealism in relation to the nature of natural numbers. The essential fact in this refutation is that the equality-type relationship (R) which we have used for

abstracting the sensuously imperceptible properties (“having value”, “having number”) is a *practically* realisable relationship. By using it we have been able, for example, to compare sets according to their power without having to count their elements.

But it was not only the cardinal and ordinal numbers that were formed by experimental means, by establishing a practically realisable one-to-one correspondence between material sets or aggregates; the basic operations with numbers are also abstractions from certain definite *practically* realisable operations with real objects.

For instance, one of the basic propositions of arithmetic, that the result of the counting of a given set does not depend on what order it is counted in, is abstracted from the practically realisable operations which man performs in counting elements of a given set of objects. Thus, in practice man learned that the last element of a certain counted set (for example, the legs of a cow) would be characterised by the number “4”, regardless of which leg of the cow he began counting from or in what order he counted them.

We use the same basic proposition of arithmetic in establishing a one-to-one correspondence between unordered sets. No matter in what order numerically equal sets are counted, we can always establish that they are equal in number.

This is the reason why one of the means of establishing a one-to-one correspondence between sets of objects can be taken as the standard of an ordered set. Its last counted element will characterise the power (number) of the objects in the set. To be more exact, the name of the last element of the standard ordered set will be at the same time the name of the last element of the counted set and the name which characterises its power. Thus if “5” is the name of the last element of a set of objects which has been brought into a one-to-one correspondence with a rational series of numbers, this name will simultaneously characterise its power because the counted set of objects is in this case a set characterised by the number “5”

5. THE PROBLEM OF DEFINITION AND SOCIAL PRACTICE

We shall now examine certain problems of definition in relation to the social sphere of activity studied by the humanities. The task of definition* in this sphere is not just to clearly distinguish the object (Dfd) by certain of its characteristics (Dfn) from other objects in the field of investigation, but also to characterise them in an *essential* manner.

In the disciplines of mathematical logic objects are usually defined according to the so-called principle of extensionality. This principle states that if in the two definitions (1) $Dfd_1 = Dfn_1$ and (2) $Dfd_1 = Dfn_2$,

* Here we are dealing with what are called clear definitions, with the structure Dfd-Dfn (read: “that which is to be defined is equal to that which defines it”).

Dfn₁ and Dfn₂ have the same extension, then definitions 1 and 2 are considered equal in the sense that in corresponding theories they are indistinguishable, equivalent, i.e., we can use either definition 1 or definition 2. Thus, if in Euclidian geometry we encounter the two following definitions: (1) "a square is an equiangular rhombus" and (2) "a square is an equilateral rectangle", we can use either definition 1 or 2 because the concepts "equiangular rhombus" and "equilateral rectangle" have the same extension. On the basis of these definitions, these axioms, these already proved theorems and previously introduced definitions we shall obtain the same corollaries (theorems), regardless of whether we use definition 1 or definition 2.

In relation to society, and consequently in relation to the humanities, the principle of extensionality in the above-mentioned form does not usually work. We cannot regard the following definitions of man as a social being as equivalent to each other: (1) "Man is a tool-making animal" and (2) "Man is an animal created by God and endowed with reason" In these definitions the Dfd is one and the same—man, but they are distinguished by different attributes. We cannot identify them if only because definition 1 is characteristic of the materialist view of man, while definition 2 is characteristic of the openly idealistic, theological view. We shall go on to show that the ineffectiveness of the principle of extensionality in the field of social reality is connected with the fact that we have included in our definitions social practice in the sense of the socially conditioned aims, ideological principles or other assessments of certain social groups, classes.

On the level of human activity, even at the most primitive stages we encounter a situation when one and the same object (natural or man-made) is used in different functions. This difference of function is sometimes registered in the different names used for one and the same object. Thus we may use one and the same piece of cloth for various purposes. If we use it for wiping a table we call it a duster, whereas if we use it for covering the table we shall call it a tablecloth, if we use it for covering the windows we call it a curtain, and so on. The point here is that it is the practical use of the object which gives prominence to its various essential properties.

At higher stages of activity, including intellectual activity, social groups or classes strive to use certain objects in their particular interests, treating as essential and giving prominence to the properties of these objects that conform to their interests. Only the representatives of the classes whose interests conform to the objectively progressive tendencies of social development are interested in revealing the objective truth, in registering that which really constitutes the essence of phenomena. Quite often, therefore, as we have already shown, we encounter *essentially* different definitions of one and the same thing. Extensionally the Dfns may be equivalent,

but the formal principle of extensionality does not operate in this case. Lenin constantly emphasised this aspect of the problem.

Dealing with the activities of bourgeois ideologists and the opportunists within the working-class movement after the death of Marx and Engels, Lenin writes that they “omit, obscure or distort the revolutionary side of this theory, its revolutionary soul. They push to the foreground and extol what is or seems acceptable to the bourgeoisie.”* This emasculation of the revolutionary essence of Marxist doctrine was applied mainly to its theory of the state. When defining *the very same class* of phenomena which Marx and Engels called the state, the bourgeois and petty-bourgeois ideologists obliterate the class character of the Marxist definition of the state. “On the one hand, the bourgeois, and particularly the petty-bourgeois, ideologists, compelled under the weight of indisputable historical facts to admit that the state only exists where there are class antagonisms and a class struggle, ‘correct’ Marx in such a way as to make it appear that the state is an organ for the *reconciliation* of classes.”** “On the other hand, the ‘Kautskyite’ distortion of Marxism is far more subtle. ‘Theoretically’, it is not denied that the state is an organ of class rule, or that class antagonisms are irreconcilable. But what is overlooked or glossed over is this: if the state is the product of the irreconcilability of class antagonisms, if it is a power standing *above* society and ‘alienating itself *more and more* from it’, it is clear that the liberation of the oppressed class is impossible not only without a violent revolution, *but also without the destruction* of the apparatus of state power which was created by the ruling class and which is the embodiment of this ‘alienation’.”***

To illustrate this thesis let us compare Lenin’s well-known definition of imperialism with the definition of imperialism given by Karl Kautsky.

Lenin’s definition: “Imperialism is capitalism at that stage of development at which the dominance of monopolies and finance capital is established; in which the export of capital has acquired pronounced importance; in which the division of the world among the international trusts has begun, in which the division of all territories of the globe among the biggest capitalist powers has been completed.”****

Kautsky’s definition: “Imperialism is a product of highly developed industrial capitalism. It consists in the striving of every industrial capitalist nation to bring under its control or to annex all large areas of *agrarian* [Kautsky’s italics] territory, irrespective of what nations inhabit it.”*)

* V. I. Lenin, *Collected Works*, Vol. 25, p. 390.

** *Ibid.*, p. 392.

*** *Ibid.*, p. 393.

**** *Ibid.*, Vol. 22, pp. 266-67.

*) *Ibid.*, p. 268.

Here the same thing is being defined, the Dfns in both cases are extensionally equal. Intensionally, however, the Dfns differ essentially from each other; they express completely different views of the new stage in the development of capitalism, different forms of generalisation and interpretation of social practice.

Lenin sharply criticises the definition of imperialism given by Kautsky. "This definition is of no use at all,..."* he writes, and goes on to point out its main defects. "Imperialism is a striving for annexations—this is what the *political* part of Kautsky's definition amounts to. It is correct, but very incomplete, for politically, imperialism is, in general, a striving towards violence and reaction. For the moment, however, we are interested in the *economic* aspect of the question, which Kautsky *himself* introduced into *his* definition. The inaccuracies in Kautsky's definition are glaring. The characteristic feature of imperialism is *not* industrial *but* finance capital."**

The problem of which definition is to be preferred is discussed on the methodological level by Lenin in his work "Once Again on the Trade Unions, the Current Situation and the Mistakes of Trotsky and Bukharin".***

This work deals with the question of how to define the trade unions. Lenin criticises Bukharin for his eclecticism and Trotsky for his abstractly one-sided metaphysical approach to the question. Naturally, the discussion was about one and the same social organisation and so the definitions in all three cases were extensionally equivalent. The argument arose over the intensional characteristics of the trade unions. The protagonists included in their definitions characteristics indicating the purpose of the trade unions in the given situation which they regarded as fundamental, that is to say, they pointed to the basic aims which, in their view, had been brought to the fore by social practice. Trotsky defined the trade unions as an administrative-technical apparatus for directing production and ignored the political function of the trade unions. Bukharin protested against the one-sidedness of all the definitions formulated by those taking part in the discussion and in his own definition combined elements from the various definitions that had been proposed. On the one hand, he alleged, the trade unions are an apparatus, on the other hand, they are a school. In one of his speeches defending his approach Bukharin cited the example of the tumbler, asserting that the definition of the tumbler should include its various functions because a tumbler is both a glass cylinder and a drinking vessel, etc.

Lenin described this approach to the formulating of definitions as eclectic. "A tumbler is assuredly both a glass cylinder and a drinking vessel. But there are more than these two properties, qualities or

* V. I. Lenin, *Collected Works*, Vol. 22, p. 268.

** Ibid.

*** Ibid., Vol. 32, p. 70.

facets to it; there are... an infinite number of 'mediacities' and inter-relationships with the rest of the world. A tumbler is a heavy object which can be used as a missile; it can serve as a paper-weight, a receptacle for a captive butterfly, or a valuable object with an artistic engraving or design, and this has nothing at all to do with whether or not it can be used for drinking, is made of glass, is cylindrical or not quite, and so on and so forth.

"Moreover, if I needed a tumbler just now for drinking, it would not in the least matter how cylindrical it was, and whether it was actually made of glass; what would matter though would be whether it had any holes in the bottom, or anything that would cut my lips when I drank, etc. But if I did not need a tumbler for drinking but for a purpose that could be served by any glass cylinder, a tumbler with a cracked bottom or without one at all would do just as well, etc."*

Lenin notes that in reference to the trade unions one can also single out a huge number of their properties, aspects and mediacities. "On the one hand, the trade unions are a school, and on the other, an apparatus; but they also happen to be an organisation of working people, an almost exclusive organisation of industrial workers, an organisation by industry, etc."** But Bukharin does not so much as attempt to explain why he chooses the two first characteristics (the trade unions as a school, and the trade unions as an apparatus) for his definition. Lenin argues that this choice should not be accidental, it must be determined by the needs of social practice. He formulates the principles of such a choice and characterises them as the principles of dialectical logic. "Firstly, if we are to have a true knowledge of an object we must look at and examine all its facets, its connections and 'mediacities' That is something we cannot ever hope to achieve completely, but the rule of comprehensiveness is a safeguard against mistakes and rigidity. Secondly, dialectical logic requires that an object should be taken in development, in change, in 'self-movement' (as Hegel sometimes puts it)... Thirdly, a full 'definition' of an object must include the whole of human experience, both as a criterion of truth and a practical indicator of its connection with human wants. Fourthly, dialectical logic holds that 'truth is always concrete, never abstract', as the late Plekhanov liked to say after Hegel."*** Applying these principles to the specific question of the definition of trade unions, Lenin comes to the conclusion that "the trade unions are a *school of technical and administrative management of production*".****

* V. I. Lenin, *Collected Works*, Vol. 32, p. 93.

** Ibid., p. 95.

*** Ibid. p. 94.

**** Ibid., p. 96.

It may be argued that what Lenin is talking about is not the necessary conditions for the formulation of valid definitions in the field of the social sciences, but assessments of social phenomena and the elaboration of goals for various forms of social activity. Even if this is so, it does not rule out the first point because very often assessments and the practical goals of social phenomena become the Dfns of the corresponding definitions. In cases where the description of the practical goal, of the functions of the object defined clearly distinguishes it from all others, we have (in the formal sense of the term) a valid definition.

Lenin's definition of the trade unions for the given stage of social development satisfies the condition of univalence of description and is therefore a valid definition (in the formal sense). In a fuller form this definition could be worded as follows: "Trade unions are mass organisations of the working class constituting a school of technical and administrative management of production." When the description of the practical functions, the goal, and assessments in the Dfn of the definition does not satisfy the condition of univalence, it is usually assumed that this description will be supplemented with another description ensuring its extensional completeness.

But the value of Lenin's arguments cited here lies not in recommendations as to how to satisfy the formal demands made on a certain class of definitions encountered in the social sciences, but in the elaboration of a methodology ensuring the formulation of a definition that is *an effective means for the realisation of the most important social practical tasks*.

We must note that sometimes two extensionally equal definitions proposed at different times by ideologists of different classes may coincide (their verbal formulations being the same). But insofar as they occur in the framework of different conceptions, there may be cases where the terms of the Dfns are so different in their essential meaning, that the definitions themselves differ essentially in their intensional relationship. It is a well-known fact, for example, that Lenin's definition of war as the continuation of politics by forcible means coincides in its formulation with the definition proposed by Clausewitz. But this does not mean that the two definitions are intensionally equal. The point is that Clausewitz divorced the policy of the ruling classes and governments from economics and unconditionally identified it with general national policy.

It stands to reason that differences in conceptions often lead also to the formulation of extensionally different definitions. In this respect it is sufficient to compare the Marxist definitions of the concepts of the nation, of social progress, etc., with the corresponding definitions proposed by bourgeois ideologists.

A. N. LEONTYEV

ACTIVITY AND CONSCIOUSNESS

In examining this problem the first point we have to consider is the question of the significance of the category of activity in any interpretation of how human consciousness is determined.

There are two approaches to this major question. One of them postulates the direct dependence of the phenomena of consciousness on the various influences exerted upon man's receptive systems. This approach was expressed with classical clarity in the 19th-century psycho-physics and physiology of the sense organs. The main task of research in those days was to establish the quantitative dependence of sensations, regarded as elements of consciousness, on the physical parameters of the stimuli affecting the sense organs. These researches were thus based on the "stimulus-response" pattern.

The limitations of this approach lay in the fact that it assumed, on the one hand, things and objects and, on the other, a passive subject influenced by them. In other words, this approach ignores the significant element of the actual relations of the subject with the objective world; it ignores his activity. Such abstraction is, of course, admissible, but only within the bounds of an experiment intended to discover certain properties of elementary structures and functions contributing to the realisation of certain mental processes. The moment one goes beyond these narrow limits, however, one realises the inadequacy of this approach, and it was this that compelled the early psychologists to explain psychological facts on the basis of special forces, such as that of active apperception, inner intention or will, etc., that is to say, to appeal to the active nature of the subject, but only in an idealistically interpreted, mystified form.

There have been many attempts to overcome the theoretical difficulties created by the postulate of immediacy underlying the approach we have just mentioned. For example, it is stressed that the effects of external influences are determined not immediately by the influences themselves, but depend on their refraction by the subject.

In other words, attention is concentrated on the fact that external causes act through the medium of internal conditions. But this notion can be interpreted in various ways, depending on what is meant by internal conditions. If they are taken to mean a change in the internal states of the subject, the notion offers us nothing essentially new. Any object can change its states and hence manifest itself in different ways in its interaction with other objects. Footprints show on soft ground but not on hard; a hungry animal reacts to food differently from one that is well fed; the literate person's reaction to a letter is different from that of the illiterate. It is another matter if by "internal conditions" we mean the special features of processes that are active in the subject. But then the main question is what these processes are that mediate the influences of the objective world reflected in the human brain.

The basic answer to this question lies in acknowledging that these processes are those that realise a person's actual life in the objective world by which he is surrounded, his social being in all the richness and variety of its forms. In other words, these processes are his activity.

This proposition requires the further definition that by activity we mean not the dynamics of the nervous, physiological processes that realise this activity. A distinction must be drawn between the dynamics and structure of mental processes and the language that describes them, on the one hand, and the dynamics and structure of the subject's activity and the language describing them, on the other.

Thus in dealing with the problem of how consciousness is determined we are confronted with the following alternative, either to accept the view implied in the "axiom of immediacy", i.e., proceed from the "object-subject" pattern (or the "stimulus-response" pattern, which is the same thing), or to proceed from a pattern which includes a third, connecting link — the activity of the subject (and, correspondingly, its means and mode of appearance), a link which mediates their interconnections, that is to say, to proceed from the "subject-activity-object" pattern.

In the most general form this alternative may be presented as follows. Either we take the stand that consciousness is directly determined by surrounding things and phenomena, or we postulate that consciousness is determined by being, which, in the words of Marx, is nothing else but the process of the *actual life of people*.

But what is the actual or real life of people?

Being, the life of each individual is made up of the sum-total or, to be more exact, a system, a hierarchy of successive activities. It is in activity that the transition or "translation" of the reflected object into the subjective image, into the ideal, takes place; at the same time it is also in activity that the transition is achieved from the ideal into activity's objective results, its products, into the material. Regarded

from this angle, activity is a process of intertraffic between opposite poles, subject and object.

Activity is a non-additive unit of the corporeal, material life of the material subject. In the narrower sense, i.e., on the psychological plane, it is a unit of life, mediated by mental reflection, by an *image*, whose real function is to orientate the subject in the objective world.

However, no matter what the conditions and forms in which man's activity proceeds, no matter what structure it acquires, it cannot be regarded as something extracted from social relations, from the life of society. Despite all its diversity, all its special features the activity of the human individual is a system that obeys the system of relations of society. Outside these relations human activity does not exist. *How it exists* is determined by the forms and means of material and spiritual communication that are generated by the development of production and that cannot be realised except in the activity of specific individuals. It stands to reason that the activity of every individual depends on his place in society, on his conditions of life.

This has to be mentioned because of the persistent efforts of the positivists to oppose the individual to society. Their view is that society provides only an external environment to which man has to adapt himself in order to survive, just as the animal must adapt itself to its natural environment. Man's activity is shaped by the success or failure of this adaptation even though this may be indirect (for example, through the attitude taken to it by the reference group). But the main thing is ignored, that in society man finds not only his external conditions to which he must adapt his activity, but also that these very social conditions carry in themselves the motives and aims of his activity, the ways and means of its realisation; in a word, that society *produces* human activity. This is not to say, of course, that the activity of the individual merely copies and personifies the relationships of society and its culture. There are some very complex cross-links which rule out any strict reduction of one to the other.

The basic, constituent feature of activity is that it has an *object*. In fact, the very concept of activity (doing, *Tätigkeit*) implies the concept of the object of activity. The expression "objectless activity" has no meaning at all. Activity may appear to be objectless, but the scientific investigation of activity necessarily demands the discovery of its object. Moreover, the object of activity appears in two forms: first, in its independent existence, commanding the activity of the subject, and second, as the mental image of the object, as the product of the subject's "detection" of its properties, which is effected by the activity of the subject and cannot be effected otherwise.

The circular nature of the processes effecting the interaction of the organism with the environment has been generally acknowledged. But the main thing is not this circular structure as such, but the fact that the mental reflection of the objective world is not directly generated

by the external influences themselves, but by the processes through which the subject comes into practical contact with the objective world, and which therefore necessarily obey its independent properties, connections, and relations. This means that the afferent agent, which controls the processes of activity, is *primarily* the object itself and only *secondarily* its image as the *subjective product* of activity, which registers, stabilises and carries in itself the objective content of activity.

The genetically initial and *fundamental* form of human activity is external activity, practical activity. This proposition has important implications, particularly as psychology, traditionally, has always studied the activity of thought and the imagination, acts of memory, and so on, since only such internal activity was considered psychological. Psychology therefore ignored the study of practical, sensual activity. And even if external activity figured to some extent in the traditional psychology, it did so only as an expression of internal activity, the activity of the consciousness.

What exactly do we have in mind when we speak of activity? Let us consider the simplest process, the process of perceiving the resilience of an object. This is an afferent or external-motor process, which may aim at performing a practical task, for example, the deformation of the object. The image that arises in the course of this process is, of course, a mental image and is therefore undoubtedly qualified for psychological study. But in order to understand the nature of this image I must study the process that generates it, and in the given case this is an external and practical process. Like it or not, I am compelled to include this process as part of the object of my psychological investigation.

Of course, the mere establishing of the need for psychological investigation to extend to the sphere of external objective activity does not solve the problem because it may be assumed that, although external objective activity comes within the range of psychological investigation, such activity plays a secondary role, since it is guided by the internal psychological process that lies beyond it, and that for this reason psychological investigation in fact does not provide for the investigation of this activity.

This is a point to be reckoned with, but only if one assumes that external activity is one-sidedly dependent on the image which controls it, and which may or may not be reinforced by the result of this activity. But this is not so. Activity is bound to encounter man-resisting objects that divert, change and enrich it. In other words, it is *external activity* that *unlocks the circle of internal mental processes*, that opens it up to the objective world.

It will readily be appreciated that the reality with which the psychologist is concerned is essentially richer and more complex than the bare outline of the way the image arises from contact with the

object that we have just drawn. But no matter how far removed the psychological reality may be from this crude pattern, no matter how profound the metamorphoses of activity may be, activity will under all circumstances remain the materialiser of the life of any given individual.

The old psychology was concerned only with internal processes, with the activity of the consciousness. Moreover, for a long time it ignored the question of the origin of these activities, i.e., their actual nature. Today the proposition that internal processes of thought are produced from the external has become almost generally acknowledged. At first, for example, internal mental processes take the form of external processes involving external objects and, as they become internal processes, *these* external processes do not simply change their form but undergo a certain transformation, becoming more general, contracted, and so on. All this is quite true, of course, but it must be stressed that internal activity is genuine *activity*, which retains the general structure of human activity, no matter in what form it takes place. Once we acknowledge the common structure of external, practical activity and internal, mental activity we can understand the exchange of elements that constantly takes place between them, we can understand that certain mental actions may become part of the structure of direct practical, material activity and, conversely, external-motor operations may serve the performance of mental action in the structure of purely cognitive activity. In the present age, when the integration and interpenetration of these forms of human activity is taking place before our eyes, when the historic opposition between them is being steadily and increasingly erased, the significance of the proposition is self-evident.

Up to now we have been talking about activity in the general, collective meaning of this concept. In reality, however, we have to deal with *concrete, specific activities*, each of which satisfies a definite need of the subject, is oriented towards the object of this need, disappears as a result of its satisfaction and is reproduced perhaps in different conditions and in relation to a changed object.

The main thing that distinguishes one activity from another lies in the difference between their objects. It is the object of activity that endows it with a certain orientation. In the terminology I have been using the object of activity is its *motive*. Naturally, this may be both material and ideal; it may be given in perception or it may exist only in imagination, in the mind.

So, different activities are distinguished by their motives. The concept of activity is necessarily bound up with the concept of motive. There is no such thing as activity without a motive; "unmotivated" activity is not activity that has no motive, but activity with a subjectively and objectively *hidden* motive.

The basic "components" of separate human activities are the *actions* that realise them. We regard action as the process that corresponds to the notion of the result which must be achieved, that is, the process which obeys a conscious goal. Just as the concept of motive is correlative with the concept of activity, so the concept of goal is correlative with that of action.

Historically, the appearance in activity of goal-oriented action processes was the result of the emergence of a society based on labour. The activity of people working together is stimulated by its product, which at first directly corresponds to the needs of all participants. But the simplest technical division of labour that arises in this process necessarily leads to the emergence of intermediate, partial results, which are achieved by individual participation in the collective labour activity, but which *in themselves* cannot satisfy the need of each participant. This need is satisfied not by the "intermediate" results, but by the share of the product of the total activity that each receives thanks to the relationships between the participants arising in the process of labour, that is, the *social* relations.

It will easily be understood that this "intermediate" result which forms the pattern of man's labour processes must be identified by him subjectively as well, in the form of an idea. This is, in effect, the setting of the goal, which determines the method and character of the individual's activity.

The identification of these goals and the formation of activities designed to achieve them lead to a kind of splitting up of functions that were previously united in their motive. Let us assume that a person's activity is stimulated by food, this is its motive. However, in order to satisfy the need for food he must perform actions that are not directly aimed at obtaining food. For example, one of his goals may be the making of trapping gear. Whether he himself will later use the gear he makes or pass it on to other participants in the hunt and receive part of the common catch or kill, in either case his motive and goal do not directly coincide, except in particular cases.

The separation of goal-oriented actions as components of human activity naturally brings up the question of their internal relations. As we have already said, activity is not an additive process. Hence actions are not separate things that are included in activity. Human activity exists as action or a chain of actions. If we were to mentally subtract from activity the actions which realise it there would be nothing left of activity. This can be expressed in another way. When we consider the unfolding of a specific process—external or internal—from the angle of the motive, it appears as human activity, but when considered as a goal-oriented process, it appears as an action or a system, a chain of actions.

At the same time activity and action are both genuine and, moreover, non-coincidental realities, because one and the same action may realise various activities, may pass from one activity to another, thus revealing its relative independence. This is due to the fact that the given action may have quite different motives, i.e., it may realise completely different activities. And one and the same motive may generate various goals and hence various actions.

So, in the general flow of activity which forms human life in its highest manifestations (those that are mediated by mental reflection), analysis first identifies separate activities, according to the criterion of the difference in their motives. Then the action processes obeying conscious goals are identified, and finally, the operations that immediately depend on the conditions for the attainment of a specific goal.

These "units" of human activity form its macrostructure. The analysis by which they are identified is not a process of dismembering living activity into separate elements, but of revealing the relations which characterise that activity. Such systems analysis simultaneously rules out any possibility of a bifurcation of the reality that is being studied, since it deals not with different processes but rather with different planes of abstraction. Hence it may be impossible at first sight, for example, to judge whether we are dealing, in a given case, with action or with operation. Besides, activity is a highly dynamic system, which is characterised by constantly occurring transformations. Activity may lose the motive that evoked it, in which case it turns into an action that realises perhaps a quite different relationship to the world, a different activity; conversely, action may acquire an independent motivating force and become a special kind of activity; and finally, action may be transformed into a means of achieving a goal capable of realising different actions.

The indisputable fact remains that man's activity is regulated by mental images of reality. Anything in the objective world that presents itself to man as the motives, goals and conditions of his activity must in some way or another be perceived, understood, retained and reproduced by his memory; this also applies to the processes of his activity, and to himself, his states and individual features.

Hence it follows that man's consciousness in its immediacy is the picture of the world that unfolds itself to him, a picture in which he himself, his actions and states, are included.

For the uninitiated person the existence of this subjective picture will not, of course, give rise to any theoretical problems; he is confronted with the world, not the world and a picture of the world. This spontaneous realism contains a real, if naive, element of truth. It is a different matter when we equate mental reflection with consciousness; this is no more than an illusion of our introspec-

tion. This illusion arises from the seemingly unlimited range of consciousness. When we ask ourselves if we are aware of this or that phenomenon, we set ourselves the task of becoming aware of it and, of course, in practice we instantly accomplish this task. It was necessary to devise a special technique of using the tachistoscope in order to experimentally separate the field of perception from the field of consciousness.

On the other hand, certain well-known facts that can easily be reproduced in laboratory conditions tell us that man is capable of complex adaptive processes in relation to objects of the environment without being at all conscious of their images; he negotiates obstacles and even manipulates things without "seeing" them at all.

It is a different matter if he must make or change a thing according to a pattern or *represent*, portray some objective content. When I shape, let us say, a pentagon out of wire, or draw it, I must necessarily compare the notion I have of it with the objective conditions, with the stages of its realisation in the product; I must internally measure one against the other. Such measurements or fittings demand that my notion should for me appear to be, as it were, on the same plane as the objective world and yet not merging with it. This is particularly evident in cases when we are dealing with problems that have to be solved by preliminarily performing "in our heads" the mutual spatial displacement of the images of objects that have to be correlated. Such, for example, is the kind of problem that demands the mental turning round of a figure inscribed in another figure.

Historically the need for such a "presentation" of the mental image to the subject arises only during the transition from the adaptive activity of animals to the productive, labour activity that is peculiar to man. The product to which activity is now directed does not yet actually exist. So it can regulate activity only if it is presented to the subject in such a form that enables him to compare it with the original material (object of labour) and with its intermediate transformations. What is more, the mental image of the product as a goal must exist for the subject in such a way that he can *act* with this image—modify it according to the conditions at hand. Such images are conscious images, conscious notions or, in other words, the phenomena of consciousness.

In itself the need for phenomena of consciousness to arise in a man's head tells us nothing about the process by which they arise. It does, however, give us a clear target for our study of this process. The point is that in terms of the traditional diadic "object—subject" pattern the existence of consciousness in the subject is accepted without any explanations, unless we count the interpretations that assume the existence in our heads of some kind of observer contemplating the pictures woven by cerebral processes.

The method of scientific analysis of the generation and functioning of human consciousness — social and individual — was discovered by Marx. The result was that the study of consciousness shifted its target from the subjectivity of the individual to the social systems of activity.

It is self-evident that the explanation of the nature of consciousness lies in the peculiar features of human activity that create the need for it — in activity's objective, productive character. Labour activity is imprinted, perpetuated in its product. There takes place, in the words of Marx, a transition of activity into a static property. This transition is the process of the material embodiment of the objective content of activity, which now presents itself to the subject, that is to say, arises before him in the form of an image of the object perceived.

In other words, a rough approximation of the generation of consciousness may be outlined thus: the representation controlling activity, when embodied in an object, acquires its second, "objectivised" existence, which can be sensuously perceived; as a result the subject, as it were, sees his own representation in the external world. When it has thus been duplicated, it is consciously understood. This pattern is not valid, however. It takes us back to the previous subjectively-empirical, essentially idealistic point of view which stresses above all the fact that this particular transition is predicated on *consciousness*, on the subject's having certain representations, intentions, mental plans, patterns or "models", that is to say, mental phenomena objectivised in activity and its products. As for the subject's activity itself, it is controlled by consciousness and performs in relation to its contents only a transfer function and the function of their "reinforcement or non-reinforcement"

But the main thing is not to indicate the active, controlling role of consciousness. The main problem lies in understanding consciousness as a subjective product, as a manifestation in different form of the essentially social relations that are materialised by man's activity in the objective world. Activity is by no means simply the expresser and vehicle of the mental image objectivised in its product. The product records, perpetuates not the image but the activity, the objective content which it objectively carries within itself.

The subject-activity-object transitions form a kind of circular movement, so it may seem unimportant which of its elements or moments is taken as the initial one. But this is by no means movement in a closed circle. The circle opens, and opens specifically in sensuous practical activity itself. Entering into direct contact with objective reality and submitting to it, activity is modified and enriched; and it is in this enriched form that it is crystallised in the product. Materialised activity is richer, truer than the consciousness that anticipates it. Moreover, for the consciousness of the

subject the contributions made by his activity remain hidden. So it comes about that consciousness may appear to be the basis of activity.

Let us put this in a different way. The reflection of the products of the objective activity which materialises the connections and relationships between social individuals appears to them to be phenomena of their consciousness. But in reality there lie beyond these phenomena the above-mentioned objective connections and relationships, not in a clear and obvious form but in a sublated form hidden from the subject. At the same time the phenomena of consciousness constitute a *real* element in the motion of activity. This is what makes them *essential*, that is to say, the conscious image performs the function of *ideal measure*, which is materialised in activity.

This approach to consciousness makes a radical difference to the way in which the problem of the correlation of the subjective image and the external object is posed. It gets rid of the mystification of this problem, which the postulate of immediacy creates. If one proceeds from the assumption that external influences *immediately*, directly evoke in us, in our brain, a subjective image, one is straightaway faced with the question as to how it comes about that this image appears to exist outside us, outside our subjectivity, in the coordinates of the external world.

In terms of the postulate of immediacy this question can be answered only by assuming a process of secondary, so to speak, projection of the mental image into the external world. The theoretical weakness of such an assumption is obvious. Besides it is clearly in contradiction with the facts, which testify that the mental image is from the very beginning "related" to a reality that is external to the subject's brain, and that it is not projected into the external world but rather extracted, *scooped out* of it. Of course, when I speak of "scooping out", this is no more than a metaphor. It does, however, express a real process that can be scientifically researched, the process of the subject's assimilation of the objective world in its ideal form, the form of its conscious reflection.

This process originally arises in the system of objective relations in which the transition of the objective content of activity into its product takes place. But for this process to be realised it is not enough that the product of activity, having absorbed this activity, should present itself to the subject as its material properties; a transformation must take place that allows it to emerge as something of which the subject is aware, that is to say, in an ideal form. This transformation is effected by means of language, which is the product and means of communication of people taking part in production. Language carries in its meanings (concepts) a certain objective content, but a content completely liberated from its materiality.

Thus, individual consciousness as a specifically human form of the subjective reflection of objective reality may be understood only as the product of those relations and mediacies that arise in the course of the establishment and development of society. Outside the system of these relations (and outside social consciousness) the existence of individual mentality, a psyche, in the form of consciousness is impossible, especially as even the study of the phenomena of consciousness in terms of human activity allows us to understand them only on the condition that man's activity itself is regarded as a process included in the system of relations, a process that realises his *social* being, which is the means of his existence also as a natural, corporeal creature.

Of course, the above-mentioned conditions and relations which generate human consciousness characterise it only at the earliest stages. Subsequently, as material production and communication develop, people's consciousness is liberated from direct connection with their immediate practical labour activity both by the isolation and subsequent separation of intellectual production and the instrumentalisation of language. The range of what has been created constantly widens, so that man's consciousness becomes the universal, though not the only, form of mental reflection. In the course of this process it undergoes certain radical changes.

To begin with, consciousness exists only in the form of a mental image revealing the surrounding world to the subject. Activity, on the other hand, still remains practical, external. At a later stage activity also becomes an object of consciousness; man becomes aware of the actions of other men and, through them, of his own actions. They are now communicable by gestures or oral speech. This is the precondition for the generation of internal actions and operations that take place in the mind, on the "plane of consciousness" *Image*-consciousness becomes also *activity*-consciousness. It is in this fullness that consciousness begins to seem emancipated from external, practical sensuous activity and, what is more, appears to control it.

Another fundamental change that consciousness undergoes in the course of historical development consists in the destruction of the original cohesion of the consciousness of the labour collective and that of its individual members. This occurs because the range of consciousness widens, taking in phenomena that belong to a sphere of individual relations constituting something *special* in the life of each one of them. Moreover, the class division of society puts people into unequal, opposed relations to the means of production and the social product; hence their consciousness experiences the influence of this inequality, this opposition. At the same time ideological notions are evolved and enter into the process by which specific individuals become aware of their real life relations.

There thus arises a complex picture of internal connections, interweaving and intertraffic generated by the development of internal contradictions, which in abstract form become apparent in the analysis of the simplest relations characterising the system of human activity. At first glance the immersion of research in this intricate picture may appear to divert it from the task of specific psychological study of the consciousness, and lead to the substitution of sociology for psychology. But this is not the case at all. On the contrary, the psychological features of the individual consciousness can only be understood through their connections with the social relations in which the individual becomes involved.

In the phenomena of consciousness we discover, above all, their sensuous fabric. It is this fabric that forms the sensuous composition of the specific image of reality — actually perceived or arising in the memory, referred to the future or perhaps only imagined. These images may be distinguished by their modality, their sensuous tone, degree of clarity, greater or less persistence, and so on.

The special function of the sensuous images of consciousness is that they add reality to the conscious picture of the world revealed to the subject. In other words, it is thanks to the sensuous content of consciousness that the world is seen by the subject as existing not in his consciousness but outside his consciousness, as the objective “field” and object of his activity. This assertion may appear paradoxical because the study of sensuous phenomena has from time immemorial proceeded from positions that lead, on the contrary, to the idea of their “pure subjectivity”, their “hieroglyphic nature”. Accordingly, the sensuous content of images was not seen as something effecting “the immediate connection between consciousness and the external world”, but rather as a barrier between them.

In the post-Helmholtz period the experimental study of the processes of perception achieved striking successes. The psychology of perception is now inundated with facts and individual hypotheses. But the amazing thing is that, despite these successes, Helmholtz’s theoretical position has remained unshaken. Admittedly, in most psychological studies it is present invisibly, backstage, so to speak. Only a few psychologists discuss it seriously and openly, like Richard L. Gregory, for example, the author of what is probably the most absorbing of modern books on visual perception.*

The strength of Helmholtz’s position lies in the fact that, in studying the physiology of eyesight, he understood the impossibility of inferring the images of objects directly from sensations, of identifying them with the patterns drawn by light rays on the retina of the eye. In terms of the conceptual structure of natural science in those days the solution of the problem proposed by Helmholtz, his

* R. L. Gregory, *The Intelligent Eye*, London, 1970.

proposition that the work of the sense organs is necessarily supplemented by the work of the brain, which builds from sensory hints its hypotheses (“inferences”) about objective reality, was the only possible one.

The point is that the objective images of the consciousness were thought of as mental phenomena depending on other phenomena for their external cause. In other words, analysis proceeded on the plane of dual abstraction, which was expressed, on the one hand, in the exclusion of the sensory processes from the system of the subject’s activity and, on the other hand, in the exclusion of sensory images from the system of human consciousness. The idea of the object of scientific cognition as a system was not properly elaborated.

In contrast to this approach, which regards phenomena in isolation from one another, the systems analysis of consciousness demands that the “formative elements” of consciousness be studied in their internal relationships generated by the development of the forms of connection that the subject has with reality and, hence, primarily from the standpoint of the function that each of them fulfils in the processes of presenting a picture of the world to the subject. The sense-data incorporated in the system of consciousness do not reveal their function directly; subjectively this function is expressed only indirectly, in a non-differentiated “sense of reality” However, it immediately reveals itself as soon as there is any interference or distortion in the reception of external influences.

The profound nature of mental sensuous images lies in their objectivity, in the fact that they are generated in processes of activity forming the practical connection between the subject and the external objective world. No matter how complex these relations and the forms of activity that realise them become, the sensuous images retain their initial objective reference.

Of course, when we compare with the immense wealth of the cognitive results of developed human activity the contributions made to it directly by our sense perceptions, our sensibility, the first thing that strikes us is how limited they are, how almost negligible. What is more, we discover that sense perceptions constantly contradict our mental vision. This gives rise to the idea that sense perceptions only provide the push which sets our cognitive abilities in motion, and that the images of *objects* are generated by internal operations of thought, unconscious or conscious, in other words, that we should not perceive the objective world if we did not conceive it. But how could we conceive this world if it did not in the first place reveal itself to us in its sensuously given objectivity?

Sensuous images are a universal form of mental reflection generated by the objective activity of the subject. But in man sensuous images acquire a new quality, namely, their meaning or

value. Values are thus the most important “formative elements” of human consciousness.

As we know, an injury to even the main sensory systems—sight and hearing—does not destroy consciousness. Even deaf, dumb and blind children who have mastered the specifically human operations of objective activity and language (which can only be done by special training, of course) acquire a *normal* consciousness differing from the consciousness of people who can see and hear only in its sensuous texture, which is extremely poor. It is a different matter when for some reason or another this “hominisation” of activity and intercourse does not take place. In this case, despite the fact that the sensorimotor sphere may be entirely intact, consciousness does not arise.

Thus, meanings refract the world in man’s consciousness. The vehicle of meaning is language, but language is not the demiurge of meaning. Concealed behind linguistic meanings (values) are socially evolved modes of action (operations), in the process of which people change and cognise objective reality. In other words, meanings are the linguistically transmuted and materialised ideal form of the existence of the objective world, its properties, connections and relations revealed by aggregate social practice. So meanings in themselves, that is to say, in abstraction from their functioning in individual consciousness, are just as “psychological” as the socially cognised reality that lies beyond them.

Meanings are studied in linguistics, semiotics, and logic. At the same time, as one of the “formative elements” of the individual consciousness they are bound to enter the range of problems of philosophy. The chief difficulty of the philosophical problem of meaning lies in the fact that it reproduces all the contradictions involved in the wider problem of the correlation between the logical and the psychological in thinking, between the logic and psychology of concepts.

A solution to this problem offered by subjective-empirical psychology is that concepts (or verbal meanings) are a *psychological product*, the product of the association and generalisation of impressions in the consciousness of the individual subject, the results of which become attached to words. This point of view, as we know, has found expression not only in psychology, but also in conceptions reducing logic to psychology.

Another alternative is to acknowledge that concepts and operations with concepts are controlled by objective logical laws, that psychology is concerned only with the deviations from these laws to be observed in primitive thinking, in conditions of pathology or great emotional stress, and that it is the task of psychology to study the *ontogenetic development* of concepts and thought. Indeed the study of this process predominates in the psychology of thought. Suffice it to

mention the works of Piaget, Vygotsky and the numerous Soviet and foreign studies of the psychology of teaching.

Studies of how children form concepts and logical (mental) operations have made a major contribution in this field. It has been shown that the formation of concepts in the child's brain does not follow the pattern of the formation of sensuous generic images. Such concepts are the result of a process of assimilation of "ready-made", historically evolved meanings, and this process takes place in the child's activity during its intercourse with the people around it. In learning to perform certain actions, the child masters the corresponding operations, which are, in fact, in a compressed, idealised form, represented in meaning.

It stands to reason that initially the process of assimilating meanings occurs in the child's external activity with material objects and in the practical intercourse it involves. At the earliest stages the child assimilates certain specific, directly referable objective meanings; subsequently it also masters certain logical operations, but also in their external exteriorised form—otherwise they would not be communicable. As they are interiorised, they form abstract meanings or concepts, and their movement constitutes internal mental activity, activity "on the plane of consciousness".

Consciousness as a form of mental reflection, however, cannot be reduced to the functioning of externally assimilated meanings, which then unfold and control the subject's external and internal activity. Meanings and the operations enfolded in them do not *in themselves*, that is to say, in their abstraction from the internal relations of the system of activity and consciousness, form any part of the subject-matter of psychology. They do so only when they are considered within these relations, in the dynamics of their system.

This derives from the very nature of mental phenomena. As we have said, mental reflection occurs owing to the bifurcation of the subject's vital processes into the processes that realise his direct biotic relations, and the "signal" processes that mediate them. The development of the internal relations generated by this division is expressed in the development of the structure of activity and, on this basis, also in the development of the forms of mental reflection. Subsequently, on the human level, these forms are so altered that, as they become established in language (or languages), they acquire a quasi-independent existence as objective ideal phenomena. Moreover, they are constantly reproduced by the processes taking place in the heads of specific individuals, and it is this that constitutes the internal "mechanism" of their transmission from generation to generation and a condition of their enrichment by means of individual contributions.

At this point we reach the problem that is always a stumbling block in the analysis of consciousness. This is the problem of the specific

nature of the functioning of knowledge, concepts, conceptual models, etc., in the system of social relations, in the social consciousness, on the one hand, and, on the other, in the individual's activity that realises his social relations, in the individual consciousness.

This problem inevitably confronts any analysis that recognises the limitations of the idea that meanings in the individual consciousness are only more or less complete projections of the "supra-individual" meanings existing in a given society. The problem is by no means removed by references to the fact that meanings are refracted by the specific features of the individual, his previous experience, the unique nature of his personal principles, temperament, and so on.

This problem arises from the real duality of the existence of meanings for the subject. This duality lies in the fact that meanings present themselves to the subject both in their independent existence — as objects of his consciousness — and at the same time as the means and "mechanism" of comprehension, that is, when functioning in processes that present objective reality to the subject. In this function meanings necessarily enter into internal relationships linking them with other "formative elements" of the individual consciousness; it is only in these internal systemic relationships that they acquire *psychological* characteristics

Let us put this in a different way. When the products of socio-historical practice, idealised in meanings, become part of the mental reflection of the world by the individual subject, they acquire new systemic qualities. The major difficulty here is that meanings lead a double life. They are produced by society and have their history in the development of language, in the history of the development of forms of social consciousness; they express the movement of science and its means of cognition, and also the ideological notions of society—religious, philosophical and political. In this objective existence of their meanings obey the socio-historical laws and at the same time the inner logic of their development.

However, despite all the inexhaustible wealth, all the diversity of this life of meanings (this is what all the sciences are about), there remains hidden within it another life and another kind of motion — their functioning in the processes of the activity and consciousness of specific individuals, even though they can exist only by means of these processes. In this second life of their meanings are individualised and "subjectivised" only in the sense that their movement in the system of social relations is not *directly* contained in them; they enter into another system of relationships, another movement. But the remarkable thing is that, in doing so, they do not lose their socio-historical nature, their objectivity.

One aspect of the movement of meanings in the consciousness of specific individuals lies in their "return" to the sensuous objectivity of the world that was mentioned above. While in their abstractness, in

their "supra-individuality", meanings are indifferent to the forms of sensuousness in which the world is revealed to the specific individual (it may be said that in themselves meanings are devoid of sensuousness), their functioning in the subject's realisation of actual relationships in life necessarily presupposes their reference to sensuous influences. Of course, the sensuous-objective reference that meanings have in the subject's consciousness need not necessarily be direct; it may be realised through all kinds of intricate chains of the mental operations, enfolded in them, particularly when these meanings reflect a reality that appears only in its remote, oblique forms. But in normal cases this reference always exists, and disappears only in the products of their movement, in their exteriorisations.

The other side of the movement of meanings in the system of the individual consciousness lies in their special subjectivity, which is expressed in the *partiality*, the bias which they acquire. This side is revealed, however, only by analysis of the internal relations that link meanings with yet another "formative element" of consciousness—the personal meaning.

Let us consider this question a little more closely. Empirical psychology has been describing the subjectivity, the partiality of human consciousness for centuries. It has been observed in selective attention, in the emotional colouring of ideas, in the dependence of the cognitive processes on needs and inclinations. It was Leibniz in his day who expressed this dependence in his well-known aphorism to the effect that "if geometry were as opposed to our passions and interests as is morality, we should contest its arguments and violate its principles despite all the proofs of Euclid and Archimedes..."*

The difficulty lay in the psychological explanation of the partiality of cognition. The phenomena of consciousness appeared to have a dual determination—external and internal. They were accordingly interpreted as belonging to two different mental spheres, the sphere of the cognitive processes and the sphere of needs, of affection. The problem of correlating these two spheres, whether it was solved in the spirit of rationalistic conceptions or of deep-going psychological processes, was invariably interpreted from the anthropological standpoint, a standpoint that assumed the interaction of essentially heterogeneous factors or forces.

However, the true nature of the apparent duality of the phenomena of the individual consciousness lies not in their obedience to these independent factors, but in the specific features of the internal structure of human activity itself.

* G. W. Leibniz, *Neue Abhandlungen über den menschlichen Verstand*, Leipzig, 1915, S. 66.

As we have already said, consciousness owes its origin to the identification in the course of labour of actions whose cognitive results are abstracted from the living whole of human activity and idealised in the form of linguistic meanings. As they are communicated they become part of the consciousness of individuals. This does not deprive them of their abstract qualities because they continue to imply the means, objective conditions and results of actions regardless of the subjective motivation of the people's activity in which they are formed. At the early stages, when people participating in collective labour still have common motives, meanings as phenomena of social consciousness and as phenomena of individual consciousness directly correspond to one another. But this relationship does not endure in further development. It disintegrates along with the disintegration of the original relationships between individuals and the material conditions and means of production, along with the emergence of the social division of labour and private property.* The result is that socially evolved meanings begin to live a kind of double life in the consciousness of individuals. Yet another relationship, another movement of meanings in the system of the individual consciousness is brought into being.

This specific internal relationship manifests itself in the most simple psychological facts. For example, all older schoolchildren know the meaning of an examination mark and the consequences it will have. None the less, a mark may appear in the consciousness of each individual pupil in essentially different ways; it may, for example, appear as a step forward (or obstacle) on the path to his chosen profession, or as a means of asserting himself in the eyes of the people around him, or perhaps in some other way. This is what compels psychology to distinguish between the conscious objective meaning and its meaning *for the subject*, or what I prefer to call the "personal meaning" In other words, an examination mark may acquire different personal meanings in the consciousness of different pupils.

Although this interpretation of the relationship between the concepts of meaning and personal meaning has often been explained, it is still quite frequently misinterpreted. It would seem necessary therefore to return to the analysis of the concept of personal meaning once again. First of all, a few words about the objective conditions that lead to the differentiation of meanings and personal meanings in the individual consciousness. In his well-known article criticising Adolf Wagner, Marx observes that the objects of the external world known to man were originally designated as the *means of satisfying his needs*, that is to say they were for him "goods" "...They endow an object with the character of usefulness as though usefulness were

* See Karl Marx, *A Contribution to the Critique of Political Economy*, Moscow, 1970, pp. 188-217.

intrinsic to the object itself," Marx writes.* This thought throws into relief a very important feature of consciousness at the early stages of development, namely the fact that objects are reflected in language and consciousness as part of a single whole along with the human needs which they concretise or "reify". This unity is, however, subsequently destroyed. The inevitability of its destruction is implied in the objective contradictions of commodity production, which generates a contradiction between concrete and abstract labour and leads to the alienation of human activity.

We shall not go into the specific features that distinguish the various socio-economic formations in this respect. For the general theory of individual consciousness the main thing is that the activity of specific individuals is always "confined" (inséré) in the current forms of manifestation of these objective opposites (for example, concrete and abstract labour), which find their indirect, phenomenal expression in the individuals' consciousness, in its specific internal movement.

Historically, man's activity does not change its general structure, its "macrostructure". At every stage of historical development it is realised by conscious actions in which goals become objective products, and obeys the motives by which it was stimulated. What does change radically is the character of the relationships that connect the goals and motives of activity. These relationships are psychologically decisive. The point is that for the subject himself the comprehension and achievement of concrete goals, his mastering of certain modes and operations of action is a way of asserting, fulfilling his life, satisfying and developing his material and spiritual needs, which are reified and transformed in the motives of his activity. It makes no difference whether the subject is conscious or unconscious of his motives, whether they declare their existence in the form of interest, desire or passion. Their function, regarded from the standpoint of consciousness, is to "evaluate", as it were, the vital meaning for the subject of the objective circumstances and his actions in these circumstances, in other words, to endow them with personal meaning, which does not directly coincide with their understood objective meaning. Under certain conditions the discrepancy between personal meanings and objective meanings in individual consciousness may amount to alienation or even diametrical opposition.

In a society based on commodity production this alienation is bound to arise; moreover, it arises among people at both ends of the social scale. The hired worker, of course, is aware of the product he produces; in other words, he is aware of its objective meaning (Bedeutung) at least to the extent required for him to be able to perform his labour functions in a rational way. But this is not the same as the personal meaning (Sinn) of his labour, which lies in the wages

* Marx/Engels, *Werke*, Bd. 19, S. 363.

for which he is working. "The twelve hours' labour, on the other hand, has no meaning for him as weaving, spinning, drilling, etc., but as *earnings*, which bring him to the table, to the public house, into bed."* This alienation also manifests itself at the opposite social pole. For the trader in minerals, Marx observes, minerals do not have the *personal meaning* of minerals.

The abolition of private property relations does away with this opposition between meaning and personal meaning in the consciousness of individuals; but the discrepancy between them remains.

The necessity of this discrepancy is implied in the deep-going prehistory of human consciousness, in the existence among animals of two types of sensibility that mediate their behaviour in the objective environment. As we know, the perception of the animal is limited to the influences which have a signal-based connection with the satisfaction of its needs, even if such satisfaction is only eventual or possible.** But needs can perform the function of mental regulation only when they act as motivating objects (including the means of acquiring such objects or defending oneself from them). In other words, in the sensuality of animals the external properties of objects and their ability to satisfy certain needs are not separated from one another. As we know from Pavlov's famous experiment, a dog responds to the influence of the conditioning food stimulus by trying to reach it and lick it.*** But the fact that the animal is unable to separate the perception of the object's external appearance from the needs it experiences does not by any means imply their complete coincidence. On the contrary, in the course of evolution their connections become increasingly mobile and extremely complex; only their separation from one another remains impossible. Such a separation takes place only at the human level, when verbal meanings drive a wedge between the internal connections of the two types of sensibility.

I have used the term *drive a wedge* (although perhaps it would have been better to say "intervene") only in order to accentuate the problem. In actual fact, in their objective existence, that is, as phenomena of social consciousness, meanings refract objects for the individual regardless of their relationship to *his* life, to *his* needs and motives. The straw which the drowning man clutches remains in his consciousness as a straw, regardless of the fact that this straw, if only as an illusion, acquires for him at that moment the personal meaning of a means of rescue.

* Karl Marx and Frederick Engels, *Selected Works*, in three volumes, Vol. 1, p. 153.

** This fact has given certain German writers grounds for making a distinction between environment (Umwelt), as that which is perceived by animals, and the world (Welt) which is perceived only by human consciousness.

*** See I. P. Pavlov, *Collected Works*, Vol. 3, Book I, Moscow, Leningrad, 1951, p. 151.

At the early stages of the formation of consciousness objective meanings merge with personal meaning, but there is already an implicit discrepancy in this unity which inevitably assumes its own explicit form. It is this that makes it necessary to distinguish personal meaning in our analysis as yet another "formative element" of the system of individual consciousness. It is these personal meanings that create what L. Vygotsky has called the "hidden" plane of the consciousness, which is so often interpreted in psychology not as a formative element in the subject's activity, in the development of his motivation, but as something that is supposedly a direct expression of the intrinsic, essential forces originally implanted in human nature itself.

In the individual consciousness the meanings assimilated from without separate, as it were, and at the same time unite the two types of sensibility: the sensuous impressions of the external reality in which the subject's activity proceeds, and the forms of sensuous experience of its motives, the satisfaction or non-satisfaction of the demands which lie behind them.

In contrast to objective meanings, personal meanings, like the sensuous tissue of the consciousness, have no "supra-individual", non-psychological existence. Whereas external sensuousness associates objective meanings with the reality of the objective world in the subject's consciousness, the personal meaning associates them with the reality of his own life in this world, with its motivations. It is the personal meaning that gives human consciousness its partiality.

We have already mentioned the fact that meanings are "psychologised" in the individual consciousness when they return to the sensuously given reality of the world. Another and, moreover, decisive factor which makes objective meanings into a psychological category is the fact that by functioning in the system of the individual consciousness they realise not themselves but the movement of personal meaning which embodies itself in them, the personal meaning which is the being-for-himself of the *concrete subject*.

Psychologically, that is to say, in the system of the subject's consciousness, and not as its subject-matter or product, meanings in general do not exist except insofar as they realise certain personal meanings, just as the subject's actions and operations do not exist except insofar as they realise some activity of the subject evoked by a motive, a need. The other side of the question lies in the fact that the personal meaning is always the meaning of *something*; a "pure", objectless meaning is just as meaningless as objectless existence.

The embodiment of personal meaning in objective meanings is a profoundly intimate, psychologically significant and by no means automatic or instantaneous process. This process is seen in all its fullness in works of literature and in the practice of moral and political education.

It is most clearly demonstrated in the conditions of class society, in the context of the ideological struggle. In this context personal meanings reflecting the motives engendered by a person's actual living relationships may fail to find objective meanings which fully express them, and they then begin to live in borrowed clothes, as it were. Picture the fundamental contradiction which this situation brings about. In contrast to society the individual has no special language of his own with meanings that he has evolved himself. His comprehension of reality can take place only by means of the "ready-made" meanings he assimilates from without—the knowledge, concepts, and views he receives through intercourse, in the various forms of individual and mass communication. This is what makes it possible to introduce into his consciousness or even impose upon that consciousness distorted or fantastic notions and ideas, including those that have no basis in his real, practical life experience. Because they have no proper basis they reveal their weakness in his consciousness, but at the same time, having become *stereotypes*, they acquire the capacity of any stereotype to resist, so that only the big confrontations of life can break them down. But even when they are broken down, the disintegrity of the consciousness, its inadequacy, is not removed; in itself the destruction of stereotypes causes only a devastation that may lead to psychological disaster. There must also be a transformation of the subjective personal meanings in the individual's consciousness into other objective meanings that adequately express them.

A closer analysis of this transformation of personal meanings into adequate (or more adequate) objective meanings shows that this occurs in the context of the *struggle* for people's consciousness that is waged in society. By this I mean that the individual does not simply "stand" in front of a display of meanings from which he has only to make his own choice, that these meanings— notions, concepts, ideas—do not passively await his choice but burst aggressively into his relations with the people who form the circle of his actual intercourse. If the individual is forced to choose in certain circumstances, the choice is not between meanings, but between the conflicting social positions expressed and comprehended through these meanings.

In the sphere of ideological notions this process is inevitable and universal only in class society. But in a way it continues to be active in any social system because the specific features of the individual's life, the specific features of his personal relations, intercourse and situations also survive, because his special features as a corporeal being and certain specific external conditions that cannot be identical for everyone remain unique.

There is no disappearance (nor could there be) of the constantly proliferating discrepancy between personal meanings which carry the

intentionality, the partiality of the subject's consciousness, and the objective meanings, which though "indifferent" to them are the sole means by which personal meanings can be expressed. This is why the internal movement of the developed system of the individual's consciousness is full of dramatic moments. These moments are created by personal meanings that cannot "express themselves" in adequate objective meanings, meanings that have been deprived of their basis in life and therefore, sometimes agonisingly, discredit themselves in the consciousness of the subject; such moments are also created by the existence of conflicting motives or goals.

It need not be repeated that this internal movement of the individual's consciousness is engendered by the movement of a person's objective activity, that behind the dramatic moments of the consciousness lie the dramatic moments of his real life, and that for this reason a scientific psychology of the consciousness is impossible without investigating the subject's activity, the forms of its immediate existence.

In conclusion I feel I must touch upon the problem of what is sometimes called the "psychology of life", the psychology of experience, which is once again being discussed in the literature. From what has been said in this article it follows that although a scientific psychology must never lose sight of man's inner world, the study of this inner world cannot be divorced from a study of his activity and does not constitute any special trend of scientific psychological investigation. What we call experiences are the phenomena that arise on the surface of the system of consciousness and constitute the form in which consciousness is immediately apparent to the subject. For this reason the experiences of interest or boredom, attraction or pangs of conscience, do not in themselves reveal their nature to the subject. Although they seem to be internal forces stimulating his activity, their real function is only to guide the subject towards their actual source, to indicate the personal meaning of the events taking place in his life, to compel him to stop for a moment, as it were, the flow of his activity and examine the essential values that have formed in his mind, in order to find himself in them or, perhaps, to revise them.

To sum up, man's consciousness, like his activity, is not additive. It is not a flat surface, nor even a capacity that can be filled with images and processes. Nor is it the connections of its separate elements. It is the internal movement of its "formative elements" geared to the general movement of the activity which effects the *real* life of the individual in society. Man's activity is the substance of his consciousness.

THE PROBLEM OF TRUTH IN THE PHILOSOPHY OF MARXISM

Although the classical Marxist writers left us no work specially devoted to the philosophy of the theory of truth, their rich legacy contains some very important ideas and propositions that, in our view, are of considerable value in regard to the further development of contemporary scientific truth theory.

This dialectical-materialist theory of truth is a dynamic, constantly developing system controlling the whole process of scientific cognition, which is predicated on the constant, complex and contradictory development of the material world itself in all its infinite diversity.

We regard the dialectical-materialist theory of truth as a rich and comprehensive doctrine embodying the progressive ideas and results of world philosophical and scientific thought, and reflecting in generalised theoretical forms the essence and regularities of the development of mankind's socio-historical practice.

As our historical and at the same time theoretical assumptions we may note the following fundamental points.

1. Genetically the dialectical-materialist theory of truth is bound up with the whole development of *world philosophical thought*, with all the progressive ideas and conceptions of truth evolved throughout the history of philosophy—from Aristotle to Hegel.

2. This theory is in organic unity with all scientific knowledge of the world. Truth is not identical with all cognition. It is a scientific result of the process of cognition. Moreover, the logic of the historical process of cognition does, in fact, emerge as the forms and categories of true knowledge or *truth* itself.

3. True knowledge must reveal the *logic of the evolution of social being*. The whole historical practice of man, his social being, the whole rich experience of the struggle of the masses for the revolutionary transformation of the world have to be generalised in the theory of truth of dialectical materialism. The formation and

development of this scientific theory of truth is, therefore, a result of man's activity in the sphere of cognition based on his social and historical practice. The latter is thus of crucial importance to the whole theory.

DEFINITION AND STRUCTURE OF TRUTH

In the process of its development philosophical thought has steadily moved towards the evolution of a concept of truth that expresses its essence with increasing fullness and precision. The highlights in this process may be noted as follows: the first notions of true knowledge in Indian and Greek philosophy, which had not yet risen to producing a concept of truth, although they were within close range of it; the understanding of truth as such, truth in general in the school of Socrates and Plato; the first definition of the concept of truth given by Aristotle, which became the basis of its classical or traditional definition as *adaequatio rei et intellectus*; formalisation of this definition, its transformation into a nominal definition of truth and the formulation of a key point in the understanding of truth — its criterion (Descartes); expansion of the concept to embrace the principles of the true method of cognition and “interpretation of nature”, establishing of the connection between the concept of truth and the principles of inductive logic (Bacon and later, Mill); the ideas and definitions evolved in German classical philosophy and its crowning edifice — the Hegelian theory of truth, which provided a whole series of definitions revealing from different angles the general understanding of truth. These included the definition of truth as a process, of truth in general, as objective truth, and of concrete truth. But the completeness and closed nature of the idealist Hegelian system absolutises it, turns it into absolute truth, into absolute knowledge in which theology, philosophy, religion and reason are merged.*

* The history of philosophical thought shows that the term truth ἀλήθεια originated in the written documents of ancient Greek philosophy. We emphasise that what we have in mind is a *term* expressing the first historical form of the *concept* of truth, and not the words denoting certain notions of truth recorded in great works of Oriental and, above all, Indian literature. The term consists of the negative particle *d* and the word ληθε meaning to be hidden, unknown, or concealment, secrecy, seclusion. This means, then, that truth is the state of being not hidden, not concealed. It is that which is revealed to the mind of man, because the very concept arises as a result of man's desire for knowledge of a hitherto unknown world. To this we may add that in connection with the understanding of the term φιλοσοφία as “love of wisdom” the term σφός is regarded as a synonym of clarity, understanding, affirmation, and, therefore, φιλοσοφία has also the meaning of love of *truth*.

The basis of all the Romance and some of the Germanic languages was *Sanskrit*. The term “var” forms the root of the Latin “verus”, the German “war”, the Cymric “gwyk”, and even the Irish “fir”, “firinne”. “Var” means that which is perfect in itself, that which must be honoured, respected, favoured, chosen. It is obvious from this that great importance was attached to the notion of truth, or rather of the true, but it would appear

Systematising the major ideas of the classical Marxist writers on truth as a general epistemological category, we can offer the reader the following definition.

Truth is the process of the reflection in human consciousness of the inexhaustible essence of the infinite material world and the regularities of its development, which at the same time implies the process of man's creation of a scientific picture of the world emerging as the concrete historical result of cognition that is constantly developing on the basis of socio-historical practice which is its highest criterion.

This definition expresses the following basic ideas. First of all, it notes the necessary, determining components of the unified, synthetic general concept of *truth as a process*, the different aspects or facets of which are interconnected in the unified movement of scientific cognition.

Second, the classical definition of truth as *adaequatio rei et intellectus* is necessarily included here in its rational and profound meaning as the expression of the determining principle of the objectivity of truth signifying not only correspondence in general, but also the expression in true concepts and categories of the objective essence of things, or objectivity in its true meaning. But in contrast to the ideas of Hegel, dialectical materialism is concerned with correspondence as reflection of the objective essence of objects of the material world, the essence of material reality itself, and not of the absolute spirit.

Third, this definition expresses the dialectical character of the concept of truth, which is its intrinsic nature.

In the definition itself this dialectical nature appears (a) in the general concept of truth as a process, which embraces *eo ipso* all the dialectical elements, (b) in the definition of truth as the creation of a scientific picture of the world constantly developing on the basis of developing social human practice, and (c) in the interpretation of truth as a concrete historical result of cognition, and here truth appears as a historical process, though not in the form of an amorphous process in general but as a real process of the achievement of concrete results of cognition both as a whole and in an uninterrupted series of partial concretely true results.

impossible to deduce the specific meaning of the terms "veritas" and "Wahrheit" (as the two main derivations) from the root "var".

In the Russian language the term "istina" has a clearly expressed ontological meaning since it derives from the verb "yest", itself a derivative of the verb "byt" ("to be"). But this should not be regarded as indicating a merging of the ontological and the epistemological, but rather as an understanding of truth as relating to that which actually exists, to what exists in reality. It is noteworthy that in Greek also the various forms derived from ἀληθεια have the analogous meaning: ἐν ἀληθειαν — in truth, in fact, in reality; ἀληθεις — true, actual, truthful; ἀληθεύω — to be true, to correspond to reality.

Fourth, truth as a process is not the development of cognition in general, but the process of creating a *scientific* picture of the world. Truth comprises the objective, scientific content of the process of cognition, its necessary, historically developing results in the form of scientific concepts, categories, theories, etc.

Anything that does not express the objective essence of things, their objective properties and relationships, is not truth, although it may be included in the general process of cognition. The concept of cognitive activity also includes such forms as finding out, learning, diagnostics and forecasting. Each of them contains not only scientific, true elements, but also a content which at a certain point in time may also contradict scientific meaning.

The *necessity* of the cognition of truth leads to the creation and development of a scientific picture of the world that directly expresses the development of truth itself, in the process of which all that is false, indefinite, sophistical is excluded as quasi-true, but by no means true.

Fifth, the definition states that truth as a process is the process of *man's creation* of a scientific picture of the world. This expresses Lenin's principle of the activeness of human reason in cognition. And this means that the scientific picture of the world is not a result of passive contemplation of the surrounding reality. Truth is cognised in the process of the dynamic creative activity of man and his reason; the cognition of truth is the creation of a scientific picture of the world as a historical process, which is truth. But we must note once again that this creation of a scientific picture of the world is not subjective and arbitrary in the sense of the "principle of tolerance" suggested by Carnap, and still less is it the creation of reality itself, even in the form of the "logical structure of the world".

The creation and development of a scientific picture of the world is the creation of truth itself as a process (and not as an already struck coin), it is a result of the reflection in man's consciousness of the objective material world, but it is by no means a process of "free", arbitrary constructing of logical patterns or linguistic forms. Consequently, truth is a result of the *positively creative activity of man as the cognising subject*, of the actively creative process of reflection of objective reality.

At the same time we regard truth as a definite *scientific system*. As we know, Lenin did not deal specifically with this question. However, various works of his contain fundamentally important ideas that, if brought together as a whole and expounded as a system, provide the basis for a deep-going analysis of the structure of the concept of truth as a fundamental epistemological category.

This system is a system of theoretical forms and categories, of the logical components of the general concept of truth, and as such it appears as a high stage of abstraction, one of the highest forms of

abstract theoretical scientific thought. In this respect the general idea of Hegel's *Science of Logic* is profoundly argued. Its highest stage is the doctrine of concepts, judgments, inferences and other logical forms by means of which human thought reaches its supreme goal—truth as the absolute idea. The theory of truth takes shape precisely in this sphere of concepts and categories, the system of which is not their mechanical sum-total, but a generalising synthesis, which testifies to an even higher degree of abstraction. It is such a theory that should produce, according to Hegel, a *rational image of truth*.

The system of epistemological categories forming the structure of truth as the highest generalised concept is a complex and many-sided system reflecting in the sphere of high scientific abstractions and through the mediating sphere of the categories of scientific cognition all the diversity of the surrounding world, its complex and contradictory connections and relationships. The polyphony of the reality available to knowledge must quite legitimately and necessarily find expression in the *polyphony of truth as a system of categories revealing its rich, multi-faceted, concrete content*.

It must be specially stressed that the meaning and significance of the creation of a system of scientific concepts expressing the many-sided and concrete content of the objects under investigation, particularly such highly complex objects as the general concept of truth itself, are ultimately revealed only from the position of dialectical understanding of such systems and the whole cognitive process in general. *Structure is the invariant of a system*. Consequently, the given correlation and connection of the concepts forming the system has a definite constant significance. But this significance should in no case be absolutised, although outside a given permanence of connections and relations of concepts structure virtually disappears. The dialectical method makes it possible to examine the conceptual structures in their real and concrete permanence, their invariance, which determines and expresses the character of the given system, and at the same time in their dynamics, in their historical and logical variability.

The system of epistemological categories forming the structure of such a complex concept as the general concept of truth is by no means given and immutable once and for all. On the contrary, it is a historically *developing system*, and, for example, the sum-total of definitions forming the Aristotelean concept of truth bears no comparison with the system of categories of Hegelian logic, whose inner dialectic is also its most important characteristic. Here the principle of dialectical logic, the principle of the unity of the logical and the historical in scientific cognition, retains its full force.

The building of the structure of truth must express the ideas implied in its very definition as a generalised concept, must reveal its diverse

aspects in the form of a series of concepts, which are not given in this definition in any apparent form, but are organically inherent therein and must be specially revealed and formulated.

Now let us consider the basic components of truth as a system of epistemological categories.

OBJECTIVITY OF TRUTH. DIALECTICS OF THE OBJECTIVE AND SUBJECTIVE IN THE CONCEPT OF TRUTH

Analysis of the content of truth as a general concept must begin from the principle of objectivity as the primary and determining element of the theory, which at the same time constitutes the inner core of the definition of the concept of truth itself. We speak here of the *principle of objectivity*, insofar as this characteristic has a universal and fundamentally decisive meaning which determines the very essence of the concept of truth in general.

This determines also the place of objectivity as the fundamental principle underlying all the other characteristics of truth. Hegel's profound idea conveyed in his proposition on *objective truth as such* has retained all its significance for Marxist theory. On the strictly epistemological plane, therefore, the opposite definition, "subjective truth", must be regarded as *contradictio in adjecto*, because it signifies the negation of truth as objective truth, that is to say, as truth in general.

At the same time, as was seen in our consideration of the definition of the general concept of truth, cognition is an aggregate of subjective forms, or *subjective images of the objective world*. So examination of the objectivity of truth also naturally demands analysis of the dialectics of the subjective and the objective in the concept of truth.

Concept of objectivity of truth. Proceeding from the above, we may formulate the following definition: *objectivity is a necessary condition, a determining characteristic of truth, signifying reflection in cognitive forms of the essence, properties and relationships of objects of the material world, signifying that the content of knowledge confirmed by practice is independent of man and mankind.*

Objective truth as a result of the reflection in man's head of the material world is inherent in all forms and types of scientific cognition. In this sense the concepts "scientific truth" and "objective truth" coincide in their content. The antithesis drawn in the phenomenology of Husserl, or rather the later Husserl, between scientific truth and the "truth of transcendental phenomenology" appears to be completely unjustified. Phenomenology in its evolution, according to Husserl, comes into conflict with the laws of scientific cognition, and this leads to negation of scientific truths about the objective world and to affirmation of truths of transcendental

phenomenology, which are fundamentally different from scientific truths and allegedly superior to them.

Beginning from the first forms of scientific cognition — on both the historical and logical planes — right up as far as its highest expressions in modern concepts and theories, all its really true propositions have objective content, which is nothing else but the content of material reality transformed in the consciousness. In all cases, as Lenin put it, the “contours of the picture are historically conditional, but the fact that this picture depicts an *objectively* existing model is unconditional”.* (Italics added.— G. K.)

Now let us take one of the highest forms of theoretical cognition — the concept of mathematical infinity and its expression in the cardinal numbers S_0, S_1, S_2, S, \dots , introduced into mathematics by the distinguished German mathematician Georg Cantor. In its general significance the concept of mathematical infinity is an extremely abstract reflection of the real infinity of the material world. From the absolute law of nature — the law of the conservation and transformation of matter and motion — one must infer a continuous and infinite series of transformations of matter, the eternity of its existence in time and space, that is to say, infinity as one of its real and inseparable properties. The *concept* of the infinite quantity has real prototypes, “models”, in the material world: the infinite classes of stars and constellations, planets and planetary systems, galaxies and galactical formations, the infinite classes of electrons, positrons, neutrons, etc.

All these real infinite quantities are expressed by the first cardinal number S_0 , which corresponds to the quantity of counting power. But the next cardinal number S , corresponding to the quantity of power of the continuum, also has its objective basis in the material world. Space and the spatial images of the real world, time and its motion, are continuous and any section of space or time possesses all the properties of the continuum and, consequently, the power of S . Powers of higher orders S_1, S_2, S, \dots express different relationships and qualitative stages of infinite quantities at a higher level of abstraction, which in no sense precludes the existence of the real infinite classes and infinitely inexhaustible properties of matter underlying the concept of mathematical infinity. Indeed, it is a fact that the properties of infinity were “overheard from nature”.

Concepts of a high degree of abstraction, one of which (and an extremely typical one) is the concept of mathematical infinity, are concerned not with the mirror-like, immediate reflection of reality, but with its complex and mediated reflection. It is often impossible, therefore, to discover a direct correlative in reality for the higher abstract concepts. We can, however, always point to some objective real basis from which scientific concepts, including the most general

* V I. Lenin, *Collected Works*, Vol. 14, p. 136.

and abstract of them, *arise* and *develop* in conformity with their intrinsic logic.

Another major feature of the objectivity of truth differs externally, formally from the first, but in its inner meaning turns out to be organically connected with it. The credit for the special singling out of this feature goes to Lenin. Characterising the concept of objective truth, he says in his work *Materialism and Empirio-criticism* that there is in our knowledge "a content that does not depend on a subject, that does not depend either on a human being or on humanity" * This independence is determined by the fact that knowledge acquires the significance of objective truth as a result of its being tested and confirmed in social practice and thus becomes independent of the opinion of individuals or even groups, independent of their evaluations of this knowledge, and so on.

Thus, both attributes of the objectivity of truth are indissolubly connected.

Subjectivity of truth. Dialectics of the objective and subjective in the concept of truth. The principle of the objectivity of truth, which by its very nature *excludes* subjectivism of cognition, and hence *subjectivism of truth*, turns out in its profound dialectical content to be in unity with the *subjectivity of truth*. The latter should not be confused with the subjectivism of cognition, which is characterised by the primacy of a subjective element that becomes dominant and leads to the ignoring and denial of the decisive meaning of the objective content of the cognitive forms as forms of the reflection of material reality. In this sense the concept "subjective truth" virtually excludes itself and becomes a pseudo-concept — in contrast to the line taken by Carnap, who treats as pseudo-concepts the concepts of "reality", "the object", "the thing", "time", "space", and virtually all the categories of scientific knowledge which, according to his conception of the logical syntax of language, lack any real objective content.

In contrast to the concept of "subjective truth" on the above-mentioned plane, the concept of "subjectivity of truth" has a necessary rational meaning. The subjectivity of truth expresses itself in the fact that it is man as a cognising subject who creates and develops the scientific picture of the world, evolves concepts, categories, scientific theories and introduces ideas and principles into the cognitive process, crowning all this with the formulation of definitions in corresponding linguistic or mathematical terms. Man as a cognising subject creates the very concept of truth, reveals its content in a definition and expresses it in terminological form.

By analysing the structure of the general concept of truth man develops a certain system of epistemological definitions, establishes connections and relationships between them as elements of a system,

* V. I. Lenin, *Collected Works*, Vol. 14, p. 122.

and builds a linguistic model of truth as a general concept. *The subjectivity of truth is the expression of the dynamic creative activity of man as a cognising subject, as a creator and vehicle of knowledge.* This holds good both in relation to the general concept of truth as a whole and in relation to any specific true proposition.

The subjectivity of truth is thus an essential element in the concept of truth. In relation to this concept we can quite rationally speak of *the scientific model as a dialectical unity of objectivity and subjectivity.* And quite naturally, every true proposition may also be regarded as a specific, concrete model of reality.

The unity of the objectivity and subjectivity of truth manifests itself all along the road of true cognition of the world and at every given moment it has a specific historical character, its content continually changes and develops, becoming more and more profound and comprehensive. But as a principle, as one of the fundamental propositions of the theory of truth, it has a universal character and is inherent in all human cognition — from Euclid and Archimedes to the supreme achievements of modern science.

Further, the unity of the subjectivity and objectivity of truth, naturally, finds expression in corresponding linguistic forms. The active role of human reason in cognition reveals itself to the full in the process of defining concepts and other epistemological forms. The culminating phase of the definition is the shaping of the necessary terms to express thoughts about the properties and attributes of objects and their classes which must be stated in the given concepts, that is to say, in the process of cognising the world man evolves certain concepts and gives them verbal, terminological expression.

Regarded in this light the symbol systems replacing certain terms and definitions in various sciences also acquire rational meaning. The symbolics of mathematics and modern logic is exceptionally rational, exact and differentiated. Mathematical symbols do not merely provide a conventional substitute for verbal terms; they are the concentrated expression in the most laconic form possible of the essence and various relationships of the actual concepts of mathematics. In this way symbols reveal themselves as possessing a content that is directly hidden behind their external form.

It need hardly be said that mathematical signs and symbols are not a mirror-like reflection of the extremely intricate quantitative and spatial relations and forms of the real world studied in all their diversity by modern mathematics. The form of the symbols and signs does not possess in itself a meaningful, concrete cognitive content. But from the general epistemological point of view any symbolic description in science necessarily presupposes the objective reality of what is being described and reflected in consciousness by means of a system of diverse cognitive forms and categories.

The objectivity and subjectivity of truth in their unity, in which objectivity always has priority, retain their significance at all levels and in all forms of scientific cognition. Far from excluding the specifics and relative autonomy of both components, this unity actually presupposes it. The objectivity of truth retains its determining significance regardless of the multiformity of its manifestation; the subjectivity of truth is a certain freedom of its expression in this multiformity, which figures directly as the dynamic creative activity of the subject, activity that is always directed at some object, towards cognition of the real world in its motion.

UNIVERSALITY AND CONCRETENESS OF TRUTH

The concept of the universality of truth combined with the concept of its concreteness forms an integral part of the structure of truth as a general concept and is united, as an inseparable element of the whole system, with its other concepts and definitions. This unity and connection of all the elements of truth as a system is ensured by the determining principles which underlie it and permeate all its inner content: the principle of the objectivity of truth, the principle of development (dynamism), and the principle of the contrariety of all cognitive forms, in the given case, of all concepts as elements of the general system of truth. The intrinsic meaning and content of the universality and concreteness of truth, which are its major categories and characteristics, reveal themselves to the full on the theoretical basis of these fundamental principles.

The profound idea of the universality of truth forms the basis of a proposition of Hegel's which runs all through his *Science of Logic*—the truth of being is essence, the truth of essence is the concept. Being, essence and concept, all possess genuine universality, and this determines the character of true knowledge. The concept as the expression of generalised essence must, in order to correspond with it, be a *universal form*. Only then does it appear as the *truth of essence*; consequently, universality is an inseparable characteristic of the truth in cognition.

In the theory of knowledge of dialectical materialism the proposition that the universality of truth is its major epistemological characteristic is based on the *unity of the existence of the world*, a unity implied in its materiality as infinite, eternally existing and developing matter. This unity is naturally manifested in the infinite diversity of phenomena and processes, but it is as the *universal of reality* that it forms the objective ground for the universality of cognition, the *universality of truth*. In this objective unity of the foundation of universality lies the foundation of the unity and connection between the universality and objectivity of truth.

But cognition does not stop at cognition of being, of the world in its present state; it aims at discovering the intrinsic essence of the

surrounding world, the essence of the multiform processes and phenomena of developing reality. By its very nature *essence* is also *something universal*; it retains the significance of a constant in its relationship to the specific diversity of the changes taking place in the real world, in relation to the specific content of its various processes.

Universality is also characteristic of the fundamental laws of development of the real world, which are as necessarily the subject of cognition as unity and essence. To be fully realised the universality of truth must embrace the sphere of laws, laws as concepts reflecting the real regularities, connections and relationships between essences in the diversity of the phenomena of reality.

The universality of truth is of great theoretical and practical importance in connection with the universal significance of the ideas and principles of Marxism-Leninism as the scientific view of the world. The term *universal truth of Marxism*, expressing the universal significance of the revolutionary theory of the working masses for all countries, all peoples, and all continents, is generally accepted in contemporary Marxist literature. We must at once emphasise, however, that this certainly does not imply any abstract schematics or imposing "from above" a "single model" for the social development of the whole world, ignoring the richness and diversity of the ways and specific features of the peoples' living social movement and struggle for a bright future. The universal regularities of progressive historical development form an organic whole with the specific diversity of the actual movements of social life.

In recent years the conception of different "models of socialism" has again become extremely widespread in pseudo-Marxist literature. Its basic method is to absolutise the particular in isolation from the general and to ignore the general, determining laws and paths for the building of socialism. For a number of years now the ideologists of reformism and revisionism have been trying to invent various kinds of "models of socialism" This has given rise to a multitude of such "constructs": "European", "Asian", "Latin American", "African" socialism, "Eastern", "Western", "Soviet", "Chinese", "Czechoslovak", "French" models of socialism, socialism "with a human face", "étatist", "bureaucratic", "market" socialism, and so on. All these models of socialism are said to be vastly different from one another and, taken together, their specific features and concrete forms are regarded as an absolute and counterposed to the general features, the general laws, the general essence of socialism as a social system. Theoretically this is due to the unscientific, metaphysical nature of this method of approach, a method diametrically opposed to the true method of cognition, which demands that we should discover the general, determining laws of the movement of society towards socialism in their organic connection with the particular, and not counterpose the one to the other.

Roger Garaudy has particularly distinguished himself of late in preaching such conceptions. He lavishes praise on the so-called “Czechoslovak” and “Chinese” models of socialism and contrasts them with the “traditional”, “Soviet” model, which he regards as nothing but a “deformed socialism” (!?). On this point Waldeck Rochet notes that Garaudy “systematically confuses the question of the different ways of *transition to socialism* with the concept of different *models* of socialism. Incidentally, the use of the term ‘model’ when talking about the ways and means of transition from capitalism to socialism is a highly debatable procedure which introduces confusion, particularly because it has the effect of blurring the general features that are inevitably part of any socialist revolution, such as the capture of political power by the working class and its allies, the abolition of large-scale capitalist property, the socialisation of the basic means of production and exchange, etc.”* Developing the idea of the general laws of transition to socialism in another speech, Rochet notes that the concept of “models of socialism” is obscure and *unscientific* precisely because it ignores the main thing: the general laws of socialism.

Indeed, from the standpoint of the demands of the theory of truth the concept of “models of socialism” is non-scientific, because it leads to ignoring the paramount requirement of the universality of truth, does not correspond with the actual state of affairs, and runs contrary to the decisive significance of the general laws of socialist revolution and the building of socialism.

As we have already said, the category of the universality of truth is inseparably linked with its “antipode”—the category of the concreteness of truth.

The concreteness of truth is a complex concept and the one-sidedness in its interpretation that sometimes occurs is completely unacceptable from the standpoint of the requirements of the Leninist theory of truth. In our interpretation of what the concreteness of truth means we proceed primarily from its unity with universality, because this unity, which directly emerges in the cognitive process, is in the final analysis a reflection of the essence and contradictory character of the material world itself, the intricate laws and patterns of its development. Lenin’s proposition characterising the objective basis of the unity of universality and concreteness in cognition would appear to be exceptionally important. In his *Philosophical Notebooks* he observes: “Nature is *both concrete and abstract, both phenomenon and essence, both moment and relation.*”** Hence the corresponding place of the categories of universality and concreteness in the structure of truth as a general concept in which they figure in their connec-

* *Cahiers du communisme*, No. 11, 1969, p. 138.

** V. I. Lenin, *Collected Works*, Vol. 38, p. 208.

tion and interconnection and in which they are directly determined by the objectivity of truth.

The concreteness of truth in its primary, most general meaning reflects the wealth of properties, connections, relationships of objects and phenomena of the material world and is the direct expression in cognition of the development of the whole concrete content of the world. In the epistemological field the concreteness of truth expresses the concreteness and determinacy of existence in its unity with the universality of essence and the universality of the main laws of motion of the material world, and this is what determines the unity of the concreteness and universality of truth as its most important epistemological characteristics.

In the very early stages of his revolutionary activity Lenin made a profound study of the ideas of the concreteness of scientific analysis, the concreteness of truth. Let us recall his proposition, which has acquired classical authority in the history of Marxist thought. As far back as 1899, in his article "Our Programme" Lenin wrote: "We do not regard Marx's theory as something completed and inviolable.... We think that an *independent* elaboration of Marx's theory is especially essential for Russian socialists; for this theory provides only general *guiding* principles, which, *in particular*, are applied in England differently than in France, in France differently than in Germany, and in Germany differently than in Russia."* This proposition has become virtually programmatic for the work of the Marxist-Leninist parties in all countries.

So, the charges against Marxists-Leninists, accusing them of "dogmatism", "abstract approach", and "standard criteria", coming particularly from revisionists (from Bernstein to Garaudy) clearly have no foundation in the facts of Marxist theory. Lenin steadily and consistently expounded the profoundly dialectical ideas of combining the general principles of revolutionary struggle with the demand for both comprehensive and concrete analysis of the real conditions in every country, at every given historical moment. The characteristic thing about Leninism is its unceasing demand for a concrete approach to reality.

The concreteness of truth also implies expression, in the process of cognition, of the properties and relationships of different, concrete and determinate aggregates of the objects and phenomena of the surrounding world. This entails cognition with the help of a set of concepts, judgments, laws, and so on, of quite definite objects and their classes, their corresponding connections and relationships.

Concrete truths in the broad epistemological sense are determined both in their content and hence in their cognitive significance by the qualitative determinacy of the corresponding aggregates of objects of

* V. I. Lenin, *Collected Works*, Vol. 4, pp. 211-12.

reality, structures and levels of real existence. This rules out abstract and indeterminate extrapolation to any objects, levels, etc., with an amorphous and abstractly vague content. It is on this plane, so it seems to us, that one should judge the significance of Lenin's formula that *there is no abstract truth, truth is always concrete*.

When considering the meaning and significance, for example, of economic categories in various historical epochs, our *scientific* analysis must reveal their specific content, which must inevitably change with the development of social relationships. The concept of value is a category of the commodity economy. It is a lump of indifferent human labour, but with the qualitative change of social relationships the content and meaning of this concept change accordingly and an abstract-metaphysical approach ignoring the specific analysis of the new content would be fundamentally invalid. The concept of value under socialism, while remaining a category of commodity economy, expresses in its new, specific content not capitalist private appropriation but quite a different, socialist distribution of material values.

All this goes to show the necessity for a strictly concrete approach to the analysis of the content of economic categories reflecting qualitatively different socio-economic relations.

This demand for concrete analysis has, as we have already said, a general epistemological significance. This significance is fully and quite definitely revealed in connection with attempts both in the past development of knowledge and in the present to build an absolute logical algorithm. They originate from the times of the "Lulliac art" of the Middle Ages; later, such thinkers as Leibniz and Laplace tried to evolve an absolute logico-mathematical algorithm for solving any mathematical or general scientific problems; in our time the semantic epistemologists Charles Morris, A. Korzybski, and R. Carnap, have proposed various solutions in the form of universal "tables of science" and systems of "metalogs", "metalanguage", and "meta-grammar", to which they seek to impart an all-embracing and absolute character. Thus, the development of the ideas of logical formalisation gave rise to a problem that is of fundamental importance for the theory of knowledge and theory of truth—the problem of the universality of the objective field in logic.

But the history of science has demonstrated the inadequacy of such abstract-metaphysical extrapolations. Beginning from the works of Schröder and Russell and other logicians and mathematicians it was established that the assumption of a universal objective field gives rise to paradoxes and antinomies that cannot be resolved on the basis of such an arbitrary and abstract assumption. Logical formalisation is rational when it embraces by means of logical analysis a certain content of definite objects reflected in human thought. The variety of logical and logico-mathematical calculi used in logical formalisation is

an expression of the diverse properties and characteristics of the fields of knowledge amenable to formalisation. This is all the more noteworthy because modern logical analysis is closely connected with the solution of specific practical problems posed by technology, by engineering, by computerisation. Naturally enough, at this point the abstract-metaphysical method with its absolutisation of the objective field of research is bound to suffer complete collapse. The principle of the concreteness of truth, on the contrary, turns out to be profoundly correct and acquires great heuristic value in that it directs logical research along the path of concrete analysis of definite fields of knowledge.

In connection with the question of the concreteness of truth we consider it necessary to introduce an attribute that has not up to now been specially pointed out in the various definitions of truth proposed in Marxist literature. Truth is a process and at the same time it appears always, at any given moment of cognition as its definite, *concretely historical result*, if, of course, one is actually dealing with truth. If we ignore or forget this fact we deprive the concept of truth of all true meaning because there can be no truth where there is not a definite and authentic result in cognition.

The whole complex and contradictory process of cognition organically comprises a series of concretely true propositions and historically determinate results without which there would be no point at all in talking about true knowledge. These concretely historical results are expressed in all the diversity of cognitive forms: in scientific concepts and categories, in scientific conceptions and theories, ideas and principles. The concrete result achieved in cognition is an expression of the real, objectively true character of cognition in general, the highest expression of the power and effectiveness of human reason.

In principle this applies to all the historical stages and concrete results of the cognitive process regardless of how complex, profound or comprehensive the treatment of the phenomena under investigation may be. This may quite legitimately be applied to Archimedes' "golden rule", Schrödinger's wave function equation in quantum mechanics; to the elementary theorems of Euclid's geometry and the geometries of n -space and ∞ -space; to the idea of the atomistic structure of matter proposed by Democritus and Epicurus and to the conceptions of the complex structure of nucleons; to the heliocentric system of Copernicus and today's notions of the structure of the metagalaxy; to the basic laws of Aristotelean logic and to the twentieth-century systems of multivalued logic, etc.

In principle the same may be said of the results of the cognition of social phenomena. An important feature here is the fact that genuinely scientific cognition of society begins with the rise of Marxism, which disclosed the real, true nature of social relationships.

At the same time it would be quite wrong, of course, to deny the existence of ideas and propositions having objectively true, fundamentally scientific significance that were enunciated by the great thinkers of the past before Marxism came into being. The first Russian Marxist G. Plekhanov in his splendid work *The Development of the Monist View of History* gave a brilliant analysis of the socio-historical theories of the French materialists of the 18th century, the French historians of the Restoration and the utopian socialists of the 19th century. He showed that their theories contained a good many correct, materialistic propositions concerning the interpretation of history: on the role of the social environment in man's life, in the formation of his consciousness, and moral standards; on the influence of economic factors upon social relationships; the significance of the "civil condition" of men (l'état des personnes) for their whole life in society, and so on. Any such proposition may legitimately be regarded as a definite result in scientific cognition of social relations possessing a quite definite, concretely true meaning.

We shall not discuss here the question of the depth and degree of cognition of social phenomena achieved with the help of this or that proposition. This is a question of the interconnection of the relativity and absoluteness of knowledge. What we would emphasise is the significance of such propositions as forms of concretely true cognition which, in aggregate, constitute the real content of the cognitive process.

All the more is this true of the major propositions of Marxism-Leninism, each of which directly demonstrates the strength and profundity of genuine scientific understanding of the nature of human society. The essence and laws of the capitalist socio-economic formation revealed in Marx's *Capital* were expressed in a series of scientific concepts and scientific laws, constituting concretely historical results of scientific cognition that are of intransient historical significance. The concreteness of truth here takes the form of an integrated and consistent theory emerging as a most important historical result of scientific cognition.

The philosophy of Marxism-Leninism is an integrated and well-structured doctrine, a dynamic system of concepts, scientific laws, conceptions and theories in their organic, intrinsic unity, in all the richness and diversity of its components. All the components of the doctrine of Marxism-Leninism are genuinely scientific achievements of human thought, objectively true, concretely historical results of scientific cognition revealing ever more comprehensively the scientific picture of the world, in other words, Truth in its development.

In the process of all scientific cognition the concreteness of truth, when taken as one of truth's main epistemological characteristics, turns out to be inseparably connected with the absoluteness and relativity of truth.

ABSOLUTENESS AND RELATIVITY OF TRUTH

The categories of the absoluteness and relativity of truth, which we are now about to examine, are closely connected with the categories of objectivity, universality and concreteness.

In our interpretation of the absoluteness of truth we proceed from the following definition. *The absoluteness of truth signifies the real possibility of complete, exhaustive knowledge of the essence and laws of the surrounding world, and is realised in the continuous and infinite process of cognising it as eternally developing matter.*

As soon as we begin to examine the two categories of absoluteness and relativity we see why explicit definitions should be used instead of the terms "absolute truth" and "relative truth". Clearly it would be extremely ambiguous to say: "Newton's theory of gravity is an absolute truth." If, on the other hand, we use an explicit definition, everything becomes logical and gives no cause for doubt. Of Newton's theory, or of any other concrete scientific theory, we can never say that it is an absolute truth, but the attribute of absoluteness of truth necessarily belongs to all such theories. In this respect the ideas of Engels and Lenin retain all their significance, while their concrete *forms of expression* must, naturally, be refined and developed.

Like the other epistemological characteristics of truth, absoluteness and relativity express the nature of Being itself, its contradictory dialectical character, which is what scientific, true cognition analyses. This was succinctly expressed by Lenin in the following definition: "The absolute and the relative, the finite and the infinite=parts, stages of one and the same world."* This expresses the idea both of the ontological basis of the categories of absoluteness and relativity, and their connection with each other and with the categories of the finite and the infinite, which are extremely important to an understanding of the laws of the cognitive process.

Absoluteness and relativity are not merely connected with the concept of objectivity; they are completely based on it, since this concept, as we have already stated, has the significance of a fundamental principle for the whole theory of truth, for all its categories and concepts. Let us recall in this connection Hegel's highly important dialectical proposition: *only the absolute is true and only the true is absolute*. This unity of objectivity and absoluteness wholly determines the essence of truth and in the final analysis its content, which reveals itself in various definitions. The same applies to the concept of the relativity of truth.

We must begin by defining this concept. *The relativity of truth is entirely based on the principle of objectivity and absoluteness; it*

* V. I. Lenin, *Collected Works*, Vol. 38, p. 107.

expresses the finite stages of human cognition, regarded as an infinite process, and denotes cognition of separate aspects and relationships of reality; it characterises the approximation of knowledge, the degree to which our consciousness penetrates into the inexhaustible essence of things, the historical level of scientific cognition achieved in any given period.

The relativity of truth is conditioned by the dialectical nature of the cognitive process taken as a whole. Cognition of objective truth (as absolute truth) is achieved not at once, not instantaneously and not in its entirety. Likewise it is not simply a process of obtaining a series of ready-made, eternal truths. Lenin specially notes that only the whole course of cognition brings one to objective truth, to the "Absolute Idea".* The different stages of cognition are, in fact, a series of relative truths creating the "general movement of cognition" as cognition of absolute truth, which in its essence is movement, a process stretching to the infinite.

The profound interconnection between the absoluteness and relativity of truth is revealed in the actual historical process of human cognition. On the one hand, the absoluteness of truth as the possibility of complete cognition of the world is realised in a continuous series of relatively true propositions reflecting ever more deeply and accurately the infinitely complex laws of the continuously developing material world. But, on the other hand, the relativity of truth implies at the same time its absoluteness because every relatively true step in the cognition of the world is a step in cognition of the full, absolute, inexhaustible content of reality.

A no less intimate connection exists between the concept of the relativity of truth and that of its concreteness. The "fuzziness" of the limits of the approximation of our knowledge to objective (and absolute) truth does not amount to a conventionalism that denies all determinacy and objectivity of the forms of knowledge. Truth is realised only in the aggregate of the various aspects and relationships of reality that are reflected and registered in the aggregate of the corresponding epistemological definitions. In this aggregate every stage, every definition directly expresses both the concreteness of truth and at the same time its relativity, insofar as Truth (absolute truth) is fully realised only in the sum-total of its components.

The above-mentioned characteristics of the relativity of truth, whose true significance is revealed only in relation to its objectivity, absoluteness and concreteness, derive from the nature of the cognitive process itself and—on the plane of "feedback"—are used as the logical criteria of this process. Let us first consider the evaluation of the vitally important idea of the connection between the

* V. I. Lenin, *Collected Works*, Vol. 38, p. 319.

geometrical properties of space and its physical nature, or the connection, as Einstein formulated it, between G (geometry) and P (physics).

This idea, one of the most seminal ideas in the theory of relativity, had been anticipated in the works of Lobachevsky and Riemann. Concerning the significance of this idea we have the authoritative testimony of Einstein himself, for whom geometry became a natural science, to be regarded in close relation to physics. For Einstein the inseparability of G and P was decisive. As he himself acknowledged, without such a view of the essence of geometry he would have *been unable to formulate the theory of relativity*.*

Historically speaking, the first step in our knowledge of the metrical properties of space was Euclid's geometry, from the principles of which the following expression was derived for the line element (in Cartesian coordinates):

$$ds^2 = dx^2 + dy^2 + dz^2$$

This expression is the first approximation in cognition of the geometrical relationships of the real world. With a certain degree of accuracy it expresses the relationship between spatial bodies, ignoring their differing physical natures. This is a quite definite, concrete, and relative truth, and hence a step in the cognition of absolute truth.

The next important stage in cognition of the metrical properties of space was the expression formulated in the theory of relativity, which used such ratios of non-Euclidean geometries as it required. Here the line element is expressed by means of the fundamental metrical tensor:

$$ds^2 = \Sigma g_{\mu\nu} dx_\mu dx_\nu$$

where the value of μ and ν ranges from 1 to 4 and where the functions $g_{\mu\nu}$, which are components of the symmetrical covariant tensor, describe both the metrical ratios in the space-time continuum and the gravitational field.** This signifies a deeper knowledge of the properties of physical space, a higher degree of penetration into the inexhaustible essence of things, but at the same time—and this is of special epistemological interest—the relationships of Euclidean geometry are by no means abolished but continue to hold good in an infinitely small field and as a first approximation, the first essential concretely historical result in the cognition of the metrical properties of real space.

However, even this expression using the fundamental metrical tensor does not exhaust the wealth and diversity of real spatial properties and relationships. As Academician V. A. Fock has pointed

* See Albert Einstein, *Ideas and Opinions*, London, 1956, p. 235.

** See Albert Einstein, *The Meaning of Relativity*, Princeton, New Jersey, 1955, p. 64.

out, this expression applies to the motion of an uncharged material point in a field of gravity. If, on the other hand, the material point is charged, it must also be subjected to the influence of the external electromagnetic field. In this case the metrics of space becomes more complex.

As we see, the process of cognition of the essence of the world of the second and third orders, etc., does not proceed in a straight line but more often follows a complex zigzag path. In the given case the deepening and refinement of the equations of the theory of relativity took yet another line. These equations assume the average even distribution of mass in space, which is, of course, an approximation. Besides, in the light of the so-called problem of cosmological singularity, there is reason to believe that OTO equations should be modified to take into account the concepts of quantum mechanics.*

But despite the exceptional and profound significance of these ideas the equations cited above do not express the whole infinite diversity of real spatial relations, they do not examine, in particular, the influence of the meson, neutron and other physical fields on the geometrical properties of space. So, the given equations cannot be regarded as absolutely complete truths, but express a definite stage in our penetration into the infinitely complex and diverse connections and relationships of real space and thus demonstrate the unity of the relativity and absoluteness of truth, a unity that corresponds to the specific level achieved in the development of knowledge.

In connection with the concept of the relativity of truth we must briefly examine the question of *paradoxical truth*, which modern science has placed on the agenda.

It is a fact that when concepts and notions are suddenly shattered during periods of scientific revolutions, the replacement of old concepts and theories by new ones is simultaneously accompanied by their fusion into a new synthesis at a new stage in cognition. But in principle this pattern occurs throughout the process of cognition, which is always contradictory in character, but not in such a radical form as at the critical points in the development of science and is to be, as a rule, observed only in certain aspects of this development.

One of the key points in this epistemological phenomenon of the paradoxality of truth is revealed by Marx. In *Wages, Price and Profit* he says: "*Scientific truth is always paradox*, if judged by everyday experience, which catches only the delusive appearance of things."** (Italics added.—G.K.) By his profound analysis of the nature of capitalist relations Marx demonstrated the correctness of this

* See R. Penrose, *Structure of Space-Time*, New York, Amsterdam, 1968.

** Karl Marx and Frederick Engels, *Selected Works*, in three volumes, Vol. 2, Moscow, 1973, p. 54.

understanding of scientific truth. He uncovered beneath the veil of commodity relations the relations between people, social classes, their contradictions and antagonisms; behind the general figures of the growth of production and social wealth he showed all the injustice of the capitalist distribution and polarisation of social forces; behind the external form of the phenomena of capitalist civilisation he revealed its antagonistic essence, its true nature, which is carefully hidden by all bourgeois economists, sociologists and philosophers. Scientific truths in the abundance provided by the genius of Marx are paradoxical in the sense that they lay bare the true essence of all the contradictions of capitalism despite the external impression it may give of "justice" and "harmony" We must once again emphasise the general epistemological significance of this principle.

In a splendid passage of his *The Phenomenology of Mind* Hegel speaks specifically of the "contradictory perception of the thing", maintaining that the true, the thing reveals itself *in two ways*. Namely: "...The thing *exhibits* itself, in a determinate and specific manner, to the *consciousness* apprehending it, but *at the same time is reflected back into itself* out of that manner of presenting itself to consciousness; in other words, the thing contains within it opposite aspects of truth...."* Here, then, lies the paradox that we encounter in understanding a thing, in other words, the paradoxality of truth, which ultimately expresses its intrinsic dialectics.

This provides us with a certain pattern of true cognition. What is more, in cognition's real history as the history of science this paradoxality has often exhibited itself as the process of *liberating consciousness from accepted dogmas and canons*, that had been regarded as unshakable and absolute, a liberation which signified the collapse of these dogmas but not the relativist's negation of the true components of preceding knowledge. In this respect we must note certain key points in the development of cognition.

The Copernican revolution in astronomy signified the collapse of dogmas that had remained unshaken for centuries, the radical supplanting of ideas that had become established in the consciousness of millions of people. Moreover, the paradoxality of the new truths was clearly manifest in the fact that they contradicted the apparently true motion of the celestial bodies.

In the history of cognition, the 17th century was the century of the creation of classical science. By the end of the 19th century a harmonious and consistent scientific picture of the physical world had emerged, all of whose components were regarded as finally established truths, unshakable canons of scientific thought in general. But the very close of the century was marked by fresh significant

* G. W. F. Hegel, *The Phenomenology of Mind*, London, New York, 1931, p. 172. (Italics are given according to the German original.—Ed.)

discoveries, and these were followed by new, paradoxical notions and conceptions and then by genuinely revolutionary theories in physics, and the first quarter of the present century saw the emergence of *non-classical physics*.

Compared with truths in the old physics the new truths are their apparent negation, they are paradoxical truths from the traditional positions. Not only individual concepts and notions but the fundamental principles and propositions are denied. Here we have Planck's idea of the radiation of energy in discrete minimal portions — quanta; Einstein's idea of the quantum nature of light; the postulates of the theory of relativity and the new understanding of space, time and motion compared with the absolute nature of these concepts in Newton's theory; the dependence of mass on its velocity and the formulation of the fundamental ratio $E = mc^2$; de Broglie's frequency-wave-length ratio; the related vital proposition of quantum mechanics on the unity between wave and particle; Bohr's complementarity principle and Heisenberg's indeterminacy principle, which form the basis of the whole edifice of quantum mechanics as the theory of the motion of microparticles of matter; the new interpretation of causality, which has negated the determinism of Laplace; the discovery of the diversity of the world of elementary particles; discoveries in the sphere of very high velocities approaching that of light; of time intervals measured in millionths of a second, and of the processes of the instantaneous transformations of some elementary particles into others.

And, finally, in connection with the increasingly profound study of the world of elementary particles the urgent need for the construction of a theory of elementary particles on fundamental principles that must not only differ from those already known in the theory of relativity and quantum mechanics, but must in many ways contradict them, be paradoxical in their new, as yet unknown content.

This whole complex and contradictory process is by no means a gradual and asymptotic approximation to absolute truth, which can never be achieved; it is a dialectical law-governed movement comprising at certain stages, in periods of decisive swings in the development of thought, the radical break-up of old concepts and notions and their replacement by new, often contradictory, paradoxical truths. In the final analysis their paradoxality is determined by the paradoxality of existence itself, by the fact that the world in its hidden essence is a "non-Euclidean world" and full of striking contradictions, these being naturally revealed in the truth-giving process of cognition itself.

Analysing this process, one of the greatest scientists and thinkers of the present century, Niels Bohr, in his famous article "Discussion with Einstein on Epistemological Problems in Atomic Physics", marking the 70th birthday of the creator of the theory of relativity,

concludes his arguments with a definition of *two kinds of truth*. "To the one kind belong statements so simple and clear that the opposite assertion obviously could not be defended. The other kind, the so-called 'deep truths', are statements in which the opposite also contains deep truth."* It is on these lines, regarded from the strictly epistemological point of view, that atomic physics has achieved its most spectacular successes in revealing the contradictory natures of the phenomena of the microworld.

It is not a matter of "crazy ideas"—the great scientist can be forgiven for that phrase—but of the profound dialectical nature of genuine truths, the unity of their objectivity, absoluteness, concreteness and relativity, which are also expressed in their paradoxality as one of the culminating moments of the contradictory process of scientific cognition, cognition of Truth in all its complexity and many-sidedness.

THE PROBLEM OF THE CRITERION OF TRUTH

The proposition that man proves by his practical activity the objective truth of his ideas, concepts, and knowledge is a general and fundamental proposition of the theory of cognition of dialectical materialism. What is more, it has become axiomatic in this philosophy. We shall, therefore, single out some of the most essential points that have a bearing on the criterion of truth.

First of all we must note Lenin's proposition on the fundamental superiority of the principle of practice over theory, since it is of decisive importance for the scientific definition of the criterion of the truth of human knowledge. Concretising Hegel's corresponding proposition, Lenin gives the following highly important formulation: "*Practice is higher than (theoretical) knowledge*, for it has not only the merit of universality, but also of immediate actuality."** This latter quality determines the fundamental difference between practice and theoretical knowledge, expresses its *independence* of knowledge and thus positively solves the problem of the reality of an adequate criterion of knowledge, the criterion of its truth. This independence is at the same time the *objectivity* of the criterion of practice, which is an absolute condition of the very possibility of singling out and using this criterion as the criterion of true knowledge.

At the same time this refutes the unjustifiable claim that in a theory of knowledge there can be no criterion of truth at all, as, for example, was asserted by Protagoras, Anaxagoras, Kant, Lessing, Nelson, Austin, Popper, Tarski and many others.***

* *Albert Einstein: Philosopher-Scientist*, New York, 1951, p. 240.

** V. I. Lenin, *Collected Works*, Vol. 38, p. 213. (The English translation has been slightly amended.— *Tr.*)

*** K. R. Popper, *Objective Knowledge. An Evolutionary Approach*, Oxford, 1972, pp. 317-18.

In contrast to all these assertions, the philosophy of Marxism provides a positive solution to the problem of the criterion of truth. Referring to the decisive role of practice for the theory of knowledge, Marx specially emphasises the importance of how practice is to be *understood*. This is the *conditio sine qua non* of the correct definition of its role as an adequate criterion of truth.

The following propositions made by Lenin are particularly relevant to the definition of the concept of practice: (1) consideration of practice on the broad social plane, as the process of people's historical activity, of the actions and struggle of the millions, as the course of world events, the "development of *all* capitalist countries",* and so on; (2) inclusion in practice of various aspects of man's material activity: technology, natural scientific discoveries; (3) the analysis of facts forming components of practice in their connection with one another, "as a whole", as a condition of their positive significance; thus interpreted the facts "are not only stubborn things, but undoubtedly proof-bearing things".** In Lenin's numerous works, and not only in his philosophical and sociological writings, we find numerous other statements about practice as the criterion of the truth of various theories, views, political ideas and doctrines, but taken as a whole these statements may quite definitely be related to one or another of the above-cited propositions.

On the basis of these major propositions made by Lenin we can formulate the following definition of practice in the theory of knowledge of dialectical materialism:

Practice is the socio-historical activity of people: activity in the sphere of material production, in the sphere of the class struggle and social relations, in the sphere of scientific observations and scientific experiments, which depend on the corresponding level of material technology.

This definition is fairly broad in its content and at the same time sufficiently rigorous and determinate from the epistemological point of view. It embraces the most important, determining aspects of man's social activity, but specifically as *material-practical activity*. Only given this content can practice perform the role of the objective criterion of the truth of such ideal forms as the categories of knowledge which go to make up the theoretical sphere, that is to say, a sphere that is fundamentally inferior to that of material-practical activity. The latter is the criterion of the truth of the former, and not vice versa.

Given this interpretation of practice, the attempts made by a number of writers to incorporate in practice all human activity, including all the forms of spiritual activity and hence theoretical

* V I. Lenin, *Collected Works*, Vol. 14, p. 143.

** *Ibid.*, Vol. 23, p. 272.

cognition itself, would appear to be quite unjustifiable. In this case it turns out that theoretical cognition becomes the criterion of itself, which virtually eliminates the possibility of any criterion or, at best, suggests a variant of the logical criterion. But even such a variant will not work because the ideal, the theoretical is interwoven with various elements of the material and it would appear quite impossible to isolate any strict premises or conclusions, as demanded by the logical criterion of truth.

Of course, human activity in general does embrace all forms of man's social being, including the spheres of literature, the arts, religion, etc. In the theory of knowledge, however, we are concerned with the epistemological significance and content of practice which has real meaning precisely in respect of the cognitive forms, as the criterion of which practice must and actually does appear as man's material activity in the spheres mentioned in our definition. Therefore, the inclusion in practice of the spiritual forms themselves renders it incapable of fulfilling its major epistemological function as the criterion of truth in cognition.

Hegel expressed the splendid thought that in order to achieve absolute truth it would be necessary to unite the theoretical and practical idea, but he was unable to provide an adequate solution to the problem of the criterion of truth. In the final analysis all forms of human activity, according to Hegel, are dissolved in the ideal, in the spirit, which forms the essence of all that exists, every aspect of which is only a manifestation of this ideal. Hegel, therefore, acknowledges virtually only one form of labour—abstract-spiritual labour. From this it follows that the latter cannot provide a real criterion because spiritual "labour" cannot test spiritual "activity", that is to say, test itself. Still less can it be higher than theoretical knowledge, that is to say once again, higher than itself.

Finally, to conclude our evaluation of the definition of practice given above we must note the *many-sidedness of its function as the criterion of truth*. Two points are fundamental here.

First, practice as socio-historical activity in the major spheres defined above serves precisely as a *general criterion of truth*, valid in relation to the natural, mathematical and social sciences. It is quite natural that the main role as the direct criterion in the various fields of knowledge is played by the corresponding specific aspects of practice.

This general character manifests itself also in relation to other spheres of spiritual production: in art, morality, religion, insofar as an epistemological aspect (for example, evaluation of the truth of moral judgments, concepts of good, justice, etc.) can be found in the latter.

Second, practice thus interpreted performs the function of the criterion of truth in general, in its general epistemological sense, and at the same time in relation to all logical aspects and components of

truth as a general concept, as a system of various specific concepts and definitions. Practice substantiates and epistemologically affirms the universality and unity, the objectivity and absoluteness of truth and at the same time its relativity, many-sidedness, concreteness and subjectivity in its connection with and dependence on objectivity. Here is manifest the dialectical nature of practice as a criterion, a quality it must have in order to perform its function in relation to truth, which has a profoundly dialectical content.

Let us first consider what in our view is the principal meaning of practice—its *determinacy and “absoluteness” as the criterion of truth.*

In various spheres of scientific cognition various sides of practice serve as the criterion of truth, which only goes to show its general character as a criterion.

The question of the criterion of truth in the sphere of mathematics is of special significance. It must be said at once that the higher mathematical categories and structures cannot be determined (from the standpoint of their truth or falsehood) by direct recourse to reality, to experience. Einstein's well-known paradoxical thesis seems to be fully justified here. Einstein said that if the theorems of mathematics apply to the reflection of the real world, they are not exact; they are exact only as long as they do not refer to reality. A good many conclusions have been drawn on this basis concerning the total absence in mathematics of any criterion of the truth of its propositions, only the formal-logical correctness of its conclusions and concepts being acknowledged. Currently this is the dominant line in Bourbaki's conception, according to which mathematical “truths” are but “special aspects of general concepts” determined by the principles and demands of the axiomatic method in the building of mathematical structures.*

Indeed, the whole edifice of mathematics as a system is built up by strictly logical means. According to Bourbaki's definition, mathematics in its main content as a theoretical discipline, as a system of abstract forms or mathematical structures, develops in accordance with logical laws and rules without having any direct reference to material objects. The high degree of abstraction achieved by mathematical structures and concepts accounts for its tremendous power and effectiveness in revealing the highly intricate forms of quantitative relationships and the extremely subtle spatial properties of the objects of the surrounding world in all their diversity and universality.

And yet we must specially emphasise that in its “ultimate” foundations this whole complex and many-sided edifice of abstract mathematical structures rests on a system of basic concepts whose

* *The American Mathematical Monthly*, Vol. 57, No. 7, 1950, p. 231.

origin is in reality. In their beginning mathematical concepts “had ... a very definite intuitive content” (Bourbaki);* the concepts of point, straight line, section, the basic axioms of geometry have, according to Einstein, an empirical origin;** the axioms of mathematics, like those of science in general, are in the final analysis the result of repetition thousands of millions of times over in practice of the real relationships of things. If all the further construction of mathematics is carried out in accordance with the laws of logic, it should not be forgotten that logical laws and forms are also a reflection of the objective in man’s subjective consciousness. Epistemologically we can say that the real origin of mathematical concepts and axioms, the expression in them of quantitative and spatial properties provides a quite rational basis for posing the problem of the criterion of their truth, proceeding from fundamental positions that are common for all knowledge, for all scientific disciplines despite all their particular features and mutual distinctions.

We must also note the decisive role of social practice in determining the truth of the ideas of Marxism-Leninism as the scientific and revolutionary world-outlook of the present epoch.

In a whole series of his works Lenin gave a comprehensive assessment of the power and truth of Marxism on the basis of its objective testing by the current historical epoch. In his article “The Historical Destiny of the Doctrine of Karl Marx” Lenin specially poses the question of the truth of Marxism as a revolutionary world-outlook on the general historical and *epistemological* planes. Of Marx’s doctrine he writes: “Has the course of events all over the world confirmed this doctrine since it was expounded by Marx?”*** Replying to his own question, Lenin analyses the three main periods in the development of world history from the moment of the creation of Marxism, characterises the development of the revolutionary and political events of each period, and specifically notes how and in what measure history bore out the truth of Marxism at the various stages.

Revolutionary practice in the form of the struggle of the working class in the period from the revolution of 1848 up to the Paris Commune revealed the utter bankruptcy of all doctrines of *non-class* socialism and *non-class* politics. In the light of this practice they all “proved to be sheer nonsense”****

The second period, 1872-1904, was characterised by new practice in the struggle of the proletariat, by the marshalling of its forces, preparation for future battles, creation of socialist parties on a fundamentally proletarian basis. In this period Marx’s doctrine

* Ibid.

** See Albert Einstein, *Ideas and Opinions*, London, 1956, p. 235.

*** V. I. Lenin, *Collected Works*, Vol. 18, p. 582.

**** Ibid., p. 583.

“gained a complete victory and *began to spread*.... Liberalism, rotten within, tried to revive itself in the form of socialist *opportunism*.”*

The third period, in which the Russian, Turkish, Persian, and Chinese revolutions took place, revealed a new source of tremendous global storms. Asia was drawn into the world-wide struggle and now, after the experience of both Europe and Asia, it became quite pointless to speak of *non-class* politics and *non-class* socialism. As Marxism foresaw, “the decay of *all* the bourgeois parties and the maturing of the proletariat are making steady progress”**

All this allowed Lenin to complete his article with the following general conclusion: “Since the appearance of Marxism, each of the three great periods of world history has brought Marxism new confirmation and new triumphs. But a still greater triumph awaits Marxism, as the doctrine of the proletariat, in the coming period of history.”***

As we know, this “coming period of history” wholly confirmed the objective truth of Lenin’s ideas and the whole Leninist doctrine of socialist revolution.

At the same time all this goes to show the complete untenability of the assertions of the bourgeois philosophers and sociologists that there is no criterion of truth in the socio-political sphere in general, where, so they allege, the only workable categories are value categories. It is hardly worth mentioning the demagoguery and bankruptcy of their allegations that the Communist parties proceed not from truth, but from the “interests of policy”. In reality, the whole situation is reversed. The ideology and all the political decisions of the Communist parties are tested by social practice, by the results of the activity and struggle of the masses of the people, by the whole course, as Lenin noted, of historical development, and this determines the objective truth, the scientific character of the ideology and policies of the Communist parties.

Thus, we are able to draw the following conclusion: the criterion of practice, taken in all the diversity of its aspects and manifestations, is quite definite and absolute in the sense that it allows us to establish the objective truth of scientific theories and views, and thus also the absoluteness of truth as an actual moment in the development of knowledge. The last part of this statement is certainly not meant to imply any dogmatic assertion of eternal, immutable, absolute and final truths such as those proclaimed in the systems of absolute idealism and in the dogmatic religious doctrines.

Now let us briefly examine the question of the “*indeterminacy*” and *relativity of the criterion of practice*. In characterising this essential

* V. I. Lenin, *Collected Works*, Vol. 18. pp. 583, 584.

** *Ibid.*, p. 585.

*** *Ibid.*

aspect of the criterion of practice in logical terms it is possible to single out the following points: (1) practice cannot give a complete and exhaustive affirmation (or denial) of all theories, conceptions, hypotheses (i.e., above all, the complex forms of scientific cognition) as a whole and in every detail; (2) nor can it fully, absolutely confirm the truth of human knowledge as "ultimate" and "absolute" truths, as infallible and eternal dogma, which would signify the end of the development of our knowledge of the world; (3) social practice itself is constantly developing and acquiring a new content, it always has at every moment of its development a specifically historical character and for this reason alone its significance as the criterion of truth cannot be absolutely dogmatic but only concretely relative.

In this connection we must note the following important points in the history of science. As we know, up to the end of the last century the attribute of undecomposability and indivisibility was considered one of the most essential attributes of chemical elements. Such was the verdict of the practice of the age, with its limited technical possibilities. The further development of practice showed that its significance could not be absolutised, for this would inevitably turn our knowledge into immutable dogma that would, as in the above case, turn out to be false assertions. We have only to recall the practical difficulties which led at certain stages even to opposite conclusions concerning the discovery of "stationary ether", which compelled physicists to repeat their experiments for half a century to obtain an authentic, objectively true result.

The same epistemological principles may be stated regarding the criterion of practice in the *sphere of the social sciences*.

The social sciences taken as a whole reflect the essence and laws of all socio-historical development. The latter has been far more rapid than that of the phenomena of nature. Particularly swift, radical and revolutionary is the succession of social events and processes in the present age of extraordinarily accelerated historical development, an unprecedentedly *dynamic* epoch in human history. For this reason alone the ideas, theories, and concepts that make up the epistemological content of the social sciences cannot be a collection of eternal and dead dogma divorced from the continuous and accelerated development of socio-historical practice. This also indicates that practice itself has a profound and consistently dynamic character, that is to say, the actual dialectical character of practice as the criterion of truth is revealed in unity with the dialectics of truth itself; it determines its objectivity (without which there can be no talk of truth in general), its absoluteness and universality, and at the same time its relativity, concreteness and the myriad forms in which it manifests itself in various fields of knowledge.

In conclusion we must consider the question of the *logical criterion of truth*.

The logical criterion is exceptionally widely and variously distributed throughout the actual process of scientific cognition and, therefore, occupies a highly significant place in the general theory of truth. Its idea lies in the following: the truth of the cognitive forms is determined by their mutual logical connections, their mutual correspondence, apart from any relation they have to an external referent.*

The actual process of scientific cognition has shown the *necessity*, under certain conditions and in corresponding forms, for the introduction of a logical criterion of truth. In a large number of cases, at certain specific moments in the movement of knowledge the criterion of practice cannot *immediately* exhibit itself and in some special situations, in respect of certain special cognitive forms and phenomena, recourse to practice as a criterion becomes quite impossible. The relative character of the criterion of practice, which is related to its historical limitations at any given moment in the development of knowledge, motivates against a sufficiently adequate proof of the truth (or falsity) of important hypotheses and predictions, for example, regarding the problem of life on other planets, the existence of planetary systems around certain stars, the past development of the Earth, the galaxy, outer space, and so on. Man is, of course, accumulating more and more empirical data, scientific experiment is making continuous progress, but there can often be no *experimentum crucis* and this means that, while using direct and indirect practical data only as our foundation—as a rule to substantiate the initial theses—we must bring into play the powerful apparatus of logic, of logical rules and relationships, logical demands for true thinking, because without such apparatus any further progress of knowledge encounters enormous obstacles and may even become practically impossible.

The “kernel” of the logical criterion of truth is the *principle of non-contradictoriness of thought*, which is of fundamental importance in logic. This principle has for centuries, in all human thinking, served as a guiding principle, determined the ways and means of developing and substantiating scientific theories, given warning of false move-

* One of the major logicians of our time Alfred Tarski in his main work *Introduction to Logic and to the Methodology of Deductive Sciences* introduces the concept of functions of truth and writes in this connection: “... the truth or falsity of a sentence obtained by substitution from a given sentential function depends upon the truth or falsity of the sentences substituted for variables” (Alfred Tarski, *Introduction to Logic and to the Methodology of Deductive Sciences*, New York, 1946, p. 40). The concept of an external referent, as the reader will have seen, is absent. Hilbert and Ackermann in their famous work *The Fundamentals of Theoretical Logic* give a similar formulation, which even more emphatically stresses the purely logical, or rather formal-logical character of this criterion: “The truth or falsity of a complex statement depends only on the truth or falsity of its constituent statements, and not on its content” (D. Hilbert und W. Ackermann, *Grundzüge der theoretischen Logik*, Berlin, Göttingen, Heidelberg, 1959, S. 6).

ments and turns of thought in the complex cognitive process. This has earned it a major place and role as one of the most powerful factors of scientific progress.

The world's greatest scientists, particularly mathematicians and physicists, have attached primary importance to the principle of non-contradictoriness and the logical criterion of truth. Euclid's *Elements* provide us with a classical example of the construction of a deductive system in accordance with this principle, in which the truth of all conclusions and theorems is wholly determined by the criterion of logic. The inventors of non-Euclidean geometries erected their theories wholly on the basis of the principle of non-contradictoriness, and the truth of the new systems was for them primarily that of logical non-contradictoriness. The powerful modern methods of building scientific systems and theories, particularly the *axiomatic method*, are based precisely on the same principle, which does not imply an abstract schematism, as might appear from the superficial approach. Concerning the significance of the axiomatic method in the architecture of mathematics as an aggregate of mathematical structures, we read in Bourbaki the following portentous lines: "The unity which it gives to mathematics is not the armour of formal logic, the unity of a lifeless skeleton; it is the nutritive fluid of an organism at the height of its development, the supple and fertile research instrument to which all the great mathematical thinkers since Gauss have contributed...."* One cannot fail to agree with this. But this implies the rationality of the logical criterion, which cannot be reduced, as would appear from its nature, to purely formal correspondences and, even less, to correspondences in the spirit of conventionalism.

This is the line of thought taken by Einstein, who frequently returned to the question of the logical criterion of truth theory. In his famous article "On the Electrodynamics of Moving Bodies", which formally initiated the theory of relativity, Einstein specially notes that it is necessary to build "a simple and *consistent theory of the electrodynamics of moving bodies* based on Maxwell's theory for stationary bodies".** (Italics mine.—G.K.) This logically vital demand was brilliantly realised by the creator of the theory of relativity.

The question of the logical criterion of truth may be summed up as follows:

1. This criterion is an essential component of the cognitive process; it is built round the law of non-contradictoriness, which is a necessary premise for the correct, logically substantiated process of constructing scientific systems; this determines the general significance of the logical criterion of truth as an important and necessary factor in the progressive development of human knowledge.

* *The American Mathematical Monthly*, Vol. 57, No. 4, 1950, p. 231.

** H. A. Lorentz, *The Principle of Relativity*, Dover Publications, Inc., 1923, p. 38.

2. The logical criterion of truth is epistemologically relative in character—its effectiveness depends on the content of the initial propositions (axioms, postulates, laws, principles), which are the objectively true elements of theory, and logically determine its structure. Naturally, their objective truth is established by the decisive criterion of practice.

3. The logical criterion of truth as a concept does not possess in itself any cognitively true meaning. It obtains this meaning in connection with and on the basis of the criterion of practice, which is determined in the actual cognitive process, usually in some complex and mediated way. If such a link is lacking the logical criterion forfeits its significance as a criterion and any attempt to absolutise it inevitably leads to sterile formalisation.

* * *

From what has been said it follows that the dialectical-materialist theory of truth, which we have considered in its main outlines, and which is based on the highest achievements of scientific knowledge and the generalisation of the developing historical practice of mankind, yields an adequate and comprehensive solution of this fundamental philosophical problem—in contrast to the conceptions of truth expounded by contemporary bourgeois philosophy, which lack a scientific foundation and are based on an idealist world-outlook.

Z. M. ORUDZHEV

SOME PROBLEMS OF DIALECTICAL LOGIC

“Dialectics as logic” is dialectical logic, which in its turn is the operation (or application) of the laws of dialectics in thought. There is a considerable divergence of opinion among Soviet philosophers concerning the subject-matter of dialectical logic. Every new formulation they suggest, however, is designed to achieve a closer definition of this subject-matter. Not so the bourgeois philosophers. If there is no divergence of opinion between Soviet writers about the solution of some particular question, the “critics” say there is no creative thinking. If, on the other hand, the conflict of opinions and creative discussion cannot be passed over, they talk of confusion and the absence of any definable subject-matter. Thus Eduard Huber expresses the view that “many Soviet writers seem to have little clarity as to what dialectical logic must be” *

But the discussion among Soviet philosophers is not about whether the subject-matter of dialectical logic exists or whether it includes such problems as the relationship between the historical and logical modes of investigating a developing subject-matter, the ascent of thought from the abstract concept to the concrete, the relationship between ascent from the abstract to the concrete and forms of thought and also the laws of dialectics; it is about the precise limits of the subject-matter, a problem which incidentally has always confronted all sciences in the course of their development, when they are posing new problems and dealing with new spheres and targets of research.

The problem of the relationship between formal logic and dialectical logic is also a very complex one. Here, too, it is difficult to enumerate all the shades of difference between the many possible solutions of the problem, solutions which clash at some points and partially coincide at others. But the situation cannot be otherwise because we are talking about how to ascertain and define the limits of

* E. Huber, *Um eine “dialektische Logik”*, München, 1966, S. 76.

the subject-matters of two logics. If at the present stage in the development of science it is difficult to establish the borderline beyond which the properties of space and time cease to be within the competence of mathematics and pass into the sphere of physics (particularly in the case of the general theory of relativity and quantum mechanics), this problem is all the more difficult to avoid in such sciences as formal logic and dialectical logic, whose subject-matters are closely related.

So what we have at present is a single subject-matter with (at worst!) vaguely defined limits. And where there is a subject-matter there must be problems. Eduard Huber, for example, regards the following problem as decisive. Is dialectics in thought the reflection of objective dialectics or does there exist a specific dialectic of thought, a dialectic of the relative and the absolute in cognition? In the former case, says Huber, formal logic must be discarded because the reflection of objective contradictions in thought cannot from the standpoint of logical form differ from "logical contradictions", which are forbidden by formal logic. So here, we are told, there arises a dilemma from which it is very difficult to escape. Only in the second case is a clear solution possible, although here, too, Huber observes, objective dialectics is not rejected.

In arriving at this judgment he fails to notice the disappearance of the difference between the first and the second case, because in both cases objective dialectics and its reflection in the dialectical movement of thought are recognised. The difference between the two cases concerns only the ways in which objective dialectics is reflected in subjective dialectics, that is, in the logic of concepts, a problem which actually does confront present-day science and which was formulated long ago by the classical exponents of Marxist-Leninist philosophy.* If they are consistent, the exponents of materialist dialectics regard the dialectics of thought as a reflection of the dialectics of objective reality. There are many statements by the classical Marxist-Leninist philosophers on this point. Some of them may be quoted here. Engels, for instance, writes that dialectics is "the science of the most general laws of *all* motion. This implies that its laws must be valid just as much for motion in nature and human history as for the motion of thought."** Engels also emphasised that in the 19th century, owing to the successes of natural science in cognising the phenomena of nature, the dialectical character of natural processes had irresistibly imposed itself on thought. "The fact that our subjective thought and the objective world are subject to the same laws, and hence, too, that in the final analysis they cannot contradict each other in their results, but must coincide, governs

* See, for example, V. I. Lenin, *Collected Works*, Vol. 38, pp. 257, 260.

** Frederick Engels, *Dialectics of Nature*, Moscow, 1974, p. 267.

absolutely our whole theoretical thought.”* Lenin took the same approach to the relationship between the laws of the development of objective reality and the movement of thought and logic. “Logic is the science not of external forms of thought, but of the laws of development ‘of all material, natural and spiritual things’, i.e., of the development of the entire concrete content of the world and of its cognition, i.e., the sum-total, the conclusion of the *History* of knowledge of the world.”**

This vital precondition of the scientific understanding of the dialectical nature of thought cannot be denied by any true exponent of materialist dialectics. But, of course, the task is not merely to repeat these propositions, but to study the actual complex dialectic through which the laws of the motion of the objective world and of thought coincide. All discussion of the relationship between existence and thought hinges on this question.

Engels regarded study of the forms of thought and of the logical categories as a highly rewarding and necessary task of science. The old (pre-Marxist) materialism studied the question of the coincidence of the laws of the objective world with the laws of thought only from the standpoint of content, and not of form. Only dialectical logic has begun to study this question also from the standpoint of form, showing the complex, contradictory dialectic of the interrelationship of the laws of motion of the objective world and the forms of their reflection in the logic of thought. But to solve this question one must also solve the question of the relationship between the forms of thought and its content, since the forms of thought (concepts, judgments and inferences) are inherent only in human cognition and do not occur in objective reality.

In this connection another question arises. What constitutes the subject-matter of formal logic and what constitutes the subject-matter of dialectical logic? Which aspects of thought are studied by formal logic and which by dialectical logic? How is the relationship between the forms and content of thought regarded in formal logic, and how is it regarded in dialectics? This means that the question of the relationship between formal logic and dialectical logic is also a question of how the laws of thought and existence coincide.

Over the last fifteen years Soviet philosophers have conducted wide-ranging research on dialectical logic. Detailed studies have been made of such principles as that of the coincidence of the historical and the logical, the ascent from the abstract to the concrete in theoretical thought, contradiction as a principle of dialectical logic, antinomy as a problem or an unsolved dialectical contradiction, and the principle of the coincidence of dialectics and logic in every separate category.

* Ibid., p. 266.

** V. I. Lenin, *Collected Works*, Vol. 38, pp. 92-93.

However, the debate still continues on the problem of the coincidence of objective dialectics with the laws of dialectical thought. On the one hand, the view is put forward that the laws and forms of the motion of things coincide with the laws and forms of the motion of human thought. This notion is opposed by the view that thought coincides in its content with the laws of the motion of things, but in its forms is distinguished from these laws by certain specific features.

The advocates of the first view come close to the Hegelian conception of the identity of being and thought. But it would be a mistake to perceive any idealism in this complete identification of the structure of objective motion with the structure of the motion of theoretical thought as a whole. Proceeding from the principle of the primacy of the material world, of objective dialectics in relation to theoretical thought, these philosophers extrapolate the principle of thought's reflection of being to its forms. Moreover, it must be remembered that the advocates of the complete identity of the structure of objective dialectics with the structure of subjective dialectics (motion of thought) do not deny the active nature of the latter. They quite rightly see the basis of this active nature in the actively transforming, creative activity of man, in the character of his practical work.

The advocates of the idea that logical, subjective dialectics has its own specific forms also proceed from the unity of the principles of the reflection and creative activity of theoretical thought. "The two assertions about thought (subjective creative activity and reflection)," writes P. V. Kopnin, for example, "not only concur, but necessarily presuppose each other."* But while accepting the unity of the above principles, the author draws the opposite conclusion in discussing the "specific features of thought".

Thus the Soviet specialists in dialectical logic, though sharing the same premises, draw different conclusions regarding the character of the coincidence of objective and subjective dialectics. It follows, then, that while remaining unanimous on the fundamental questions, they disagree about the definition of precise limits of the coincidence of the one with the other. It also follows that among materialist dialecticians there can be no difference of opinion regarding the fact that the logical is a unity of the objective and subjective (of reflection and creative activity).

The forms of thought are the forms which make the laws of dialectics into laws of thought, and objective dialectics into subjective dialectics. The laws of dialectics constitute the source of the content

* P. V. Kopnin, *Filosofskiye idei Lenina i logika (Philosophical Ideas of Lenin and Logic)*, Moscow, 1969, p. 152.

of theoretical thought.* But this proposition does not yet reveal the specific nature of the logical, i.e., of subjective dialectics. This specific nature is the movement, the operation of the laws of dialectics in the form of concepts, judgments, inductions, deductions, analysis and other forms of inference, which in connection with the laws of dialectics (as their own content) themselves become a complex structure — *the logical method*. To sum up what has been said about the subjective and objective sides of the logical, it may be stated that the very thing which is specific to cognition, to thought, is the subjective form of the latter, i.e., that which makes dialectics into logic is the *system of the forms of thought*.

But it follows from this that one cannot pursue Hegel's line in identifying the modes of movement of theoretical thought with those of objective reality, although both obey the same laws of dialectics. This is what Marx had in mind when he wrote that "the method of ascent from the abstract to the concrete is only the means by which thought absorbs the concrete, reproduces it spiritually as the concrete. However, this is not in any sense the process by which the concrete comes into being."**

The next important element in dialectical logic is the doctrine of contradiction in thought as reflection of the objectively existing contradictions of the motion and development of things. "The relations (=transitions=contradictions) of concepts=the main content of logic, *moreover* these concepts (and their relations, transitions, contradictions) are shown as reflections of the objective world."***

Since the reflection of the contradictions of the objective world is the basic content of theoretical thought, the question of the structure of these contradictions is of particular interest. Naturally enough the opponents of Marxist philosophy launch their main attack against the doctrine of contradictions as the essence of all motion and development. Here we have the well-known Gustav A. Wetter, Robert Heiss, the already mentioned Eduard Huber and many others, who assert that contradiction, understood as the conjunction of opposed statements taken at one and the same time, in one and the same relation and sense, is forbidden by formal logic. So from their point of view dialectics as logic is in conflict with science, the science of formal logic. Unfortunately, some Marxist philosophers have been so worried about this illusory conflict as to declare that the conjunction of two opposed statements taken in different senses is a dialectical contradiction. And this despite the fact that in formal logic

* "The sole content of thinking is the world and the laws of thought" (Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 385).

** K. Marx, *Grundrisse der Kritik der politischen Ökonomie*, Moscow, 1939, S. 22.

*** V. I. Lenin, *Collected Works*, Vol. 38, p. 196. (The translation has been slightly revised.— *Tr.*)

itself, ever since the time of Aristotle, it has been well known that such a form of the connection of concepts and statements cannot be contradictory. The whole grandiose history of dialectics is thus reduced to the allegation that a non-contradictory form of relation, long since regarded in formal logic as non-contradictory, is declared to be a dialectical contradiction.

But the whole essence of the question is that dialectical logic regards as a dialectical contradiction not the direct conjunction of statements opposed in the same respect, but their unity mediated by intermediate links. "For a stage in the outlook on nature where all differences become merged in intermediate steps, and all opposites pass into one another through intermediate links, the old metaphysical method of thought no longer suffices. Dialectics, which besides 'either—or' recognises also in the right place 'both this—and that' and reconciles the opposites, is the sole method of thought appropriate in the highest degree to this stage."* In *Anti-Dühring* Engels criticises metaphysics for always thinking in terms of immediate opposites. In *Capital* Marx brilliantly resolved theoretical contradictions by his method of analysis of "intermediate links"

If any further proof is needed that opposites, taken in one and the same relation, did not worry the classical exponents of Marxist philosophy but rather, on the contrary, pleased them, I can cite yet another passage, from Lenin's *Philosophical Notebooks*. In his careful summarising of Hegel's lectures on the history of philosophy Lenin copied out the following passage. "The point of difficulty, and what we ought to aim at, is to show that what is other is the same, and what is the same is other, and indeed in the same regard and from the same point of view."** Against this passage of Hegel's Lenin wrote "NB", thus indicating his positive attitude to the statement.

So we are confronted with two types of contradiction, taken in one and the same relation (and sense). The task is to investigate again and again how dialectical contradictions "work" in scientific cognition, how they develop along with the movement of cognition and how the contradictions of formal logic, these relationships devoid of any of the "intermediate links" that in fact characterise the complex structure of dialectical contradiction, are overcome.

It seems to us that the elaborations of the logical calculi that benefit the development of formal logic are quite superfluous when we are dealing with the logical expression of dialectical contradictions in thought because the logical form of dialectical contradiction does not coincide with formal-logical contradiction.

Dialectical logic, as distinct from formal logic, examines not the immediate connections and relationships between statements, but

* Frederick Engels, *Dialectics of Nature*, Moscow, 1974, pp. 212-13.

** V. I. Lenin, *Collected Works*, Vol. 38, pp. 280-81.

those mediated by “intermediate links”, which cannot be inferred from any premises included in the given relation. In formal logic a mediated inference is an inference in which the conclusion is reached on the basis of more than one premise.

For example: All bodies expand when heated;
Any metal is a body;

Any metal expands when heated.

Moreover, in formal logic, mediated knowledge is the result of the polysyllogism (chain of syllogisms), the sorites (polysyllogism with suppressed intermediate conclusions), and so on.

In dialectical logic the concept of “intermediate links” differs in its meaning and content from the more general, abstract concept of “intermediate links” in formal logic. The form of the sorites may be illustrated as follows:

All A is B
All B is C
All C is D
All D is E

All A is E

As we see, every mediating premise is drawn from or rather *directly* connected with the preceding one, and *directly* coincides with it in one or another term. There is nothing “in-between” Let us take the rule of substitution, one of the rules of inference used in the sentential and the predicate calculus. According to this rule, any letter in the formula “ $A \rightarrow (B \vee A)$ ” may be replaced by any formula wherever that letter is encountered in the given formula. For example, in the above formula we can substitute for A the formula “ $A \vee B$ ” and we get: $(A \vee B) \rightarrow [B \vee (A \vee B)]$. If the initial formula was true, the new formula thus achieved will also be true. But the main thing is that the connection between the statements, whatever kind of chain of intermediate statements it may consist of, ultimately turns out to be immediate. *The initial proposition and the result coincide directly because they are interchangeable.* This is of great importance in dialectical logic also. Formal logic lays down rules with the help of which one can always avoid a *direct* identification of non-identical, non-coincidental opposite statements, of which at least one is bound to be false.

Dialectical logic is not concerned with direct, immediate logical connections (this is the domain of formal logic); it deals, as we have

already said, with a certain relationship of logical connections, which also includes, however, the “intermediate links” that in actual reality modify the movement of things, leading to their transformation, their passing into “their other”, the directly opposite. So the dialectical contradiction differs mainly from the formal-logical contradiction in the way the opposite statements are related; to express this connection the usual symbols $\&$, \vee , \supset , ∞ (conjunction, disjunction, implication, negation) are not in themselves sufficient. For dialectical logic one also needs symbols that show intermediate links. These are usually expressed by the letters of the Greek alphabet: α , β , γ , and so on. Thus, in symbolic form one could present the dialectical contradiction as follows: $P(\alpha, \beta, \gamma, \dots, \omega)Q$, where $Q = P +$ a system of mediating links or relations. The relations between α, β, γ , etc., and consequently between P and \bar{P} , do not coincide with any of the above-mentioned symbols $\&$, \vee, \supset, ∞ , but must include them as separate elements of a more complex mediacy. Each of the intermediate links combines in itself various separate features, the properties of the opposites P and Q . Therefore they are not interchangeable (because the relation of the properties of P and Q is different in each separate case).*

The relation of each part of the formula with every other part must be analysed by means of the laws and rules of formal logic but cannot be reduced to them alone. For example, one cannot assert that P is α or that α is β , etc. Nor can one assert that P belongs to α or that α belongs to β , and so on, but it can be asserted that P, α, β , etc., belong to the relation “ $P(\alpha, \beta, \gamma, \dots, \omega)Q$ ”. With the help of the laws and rules of formal logic one can link the parts of the above relation with one another and each of its parts with objects of reality, but these laws and rules do not provide means for determining the *quantity* and *order* of examining the intermediate parts of a contradictory relation, not to mention, of course, the choice of these parts of the relation.

Finally, a few words must be said about the law of the excluded middle as represented in the formula $P \vee \bar{P}$ (P is either or not P). Hegel criticised this law because he believed that in reality no such relation could exist since opposites are always mediated by a middle term. And it is a fact that the law of the excluded middle does to a certain extent ignore such intermediate elements as transitional states comprising contradictory features. For example, take the statement “this object is either a chair or not a chair”. If we decide that it is a chair, then in doing so, by means of this logical form, we classify

* It should be noted that the structure of any real object, and of the knowledge which reflects it, is a *system of intermediate links* connecting its opposite elements (the proton and electron in the atom, input and output in cybernetics, and in any technical system, production and consumption in society, and so on).

other objects, unfinished, not completely built chairs, as “not chairs” They, too, however may be regarded as chairs (it all depends on our criteria). In fact an unfinished chair may be both a chair and not a chair (if we choose as our criterion some truly intermediate state). Admittedly, we can refine our statement and say: “This is a chair in the making.” But then we shall have to indicate a strict borderline between the made and the unmade and we shall find that the “width” of this borderline is not zero, thus making the borderline itself a transitional state* that in other cases may be much more distinct (for example, the organism in the transitional period of evolution from ape to man, etc.). The theory of relativity tells us that the velocity of interaction and transformation in the objective world is not infinite, and so the rigid limits by which we divide things, states, concepts and so on from each other are relative, there being no absolutely instantaneous changes or transformations, and this is a perfectly admissible and necessary “convention” from which, paradoxically, no judgment of this type is free.

In view of this fact we regard as erroneous the denial by the mathematical intuitionists (L. Brouwer, A. Heyting and others) of the applicability of the law of the excluded middle in operations with infinite sets (they reject the concept of actual infinity and recognise only potential infinity, i.e., an infinity which is becoming). The mathematical intuitionists argue as follows. It is impossible to prove that in the future there will or will not be a sequence of numbers which we should designate by the symbol A , in the magnitude $\pi = 3.14158\dots$ because this numerical series is virtually inexhaustible. But proving or disproving is irrelevant in the given case. The simple fact is that the law of the excluded middle does not in itself provide conditions for defining the truth of this or that concrete statement either in the future or even in the present. So the above-mentioned notion of potential infinity cannot serve as a basis for rejecting the use of the law of the excluded middle in certain fields of scientific cognition.**

So the whole question is how are dialectical contradictions resolved and how are formal-logical contradictions removed.

In the first place, opposite true statements about one and the same thing, at the same time and in one and the same sense, are antinomies or

* This circumstance is noted also in set theory for separate and essentially obvious cases. “...In fact, in view of the previous description the ‘middle’ (or the ‘third case’, as it is called in Latin and in French) becomes quite natural; it is the interval between proving a general statement and constructing a counter-instance from which an existential ‘statement-abstract’ may be derived” (Abraham A. Fraenkel and Jehoshua Bar-Hillel, *Foundations of Set Theory*, Amsterdam, 1958, p. 220).

** As Mario Bunge observes, “... contrary to a widespread misconception, in intuitionistic logic the law of the excluded middle is not rejected” (Mario Bunge, *Intuition and Science*, New York, 1962, p. 50).

logical contradictions. They are only antinomies because the intermediate or mediate parts of the contradiction are absent or rather unknown. Their direct, immediate comparison makes them antinomies. If they were taken "in different relations" or at different times they would not be antinomies. So an antinomy (or contradiction) can simply be eliminated altogether if we can refine the meaning of the contradictory statements and show that they should be taken "in different relations", at different times or in different senses, but it can also be resolved by finding the intermediate elements of the contradiction which mediate its motion, the transition of opposites into one another.

Secondly, the antinomy is to be distinguished from the contradiction of formal logic because in the latter one of the opposed statements must be false. So the elimination of a formal-logical contradiction is achieved by removing the false statement or statements.

Thirdly, an important part in the elimination of the formal-logical contradiction and the formulation of an antinomy is played by the procedure of empirical testing, including the principle of verification. Verification, which compares opposed statements with the empirical facts, helps to determine which of the opposed statements is false (and to be rejected), and which is true. It also helps us to refine the meaning of the statements and give a more precise formulation of the antinomy (the unsolved theoretical dialectical contradiction). Verification is therefore essential to the precise formulation of an antinomy but is not, of course, a means of resolving it. Verification confirms that the antinomy is correctly formulated, but what the relation between the intermediate links is, and particularly their sequence cannot be immediately discovered in the empirical sphere.

Fourthly, the method of resolving the dialectical contradiction is of a purely theoretical nature, while the principle of verification is empirical.* Every method designed to compare or connect knowledge (at any stage) with the object is empirical. Moreover, it does not matter how many stages or links must be passed through "vertically" (from knowledge to the object and back) to establish this connection. A theoretical method is the method that enables us to analyse the *relations* between phenomena, although it is never applied in pure form, but is interrupted by the movement of cognition in the "vertical plane"—either for confirming the intermediate result or for bringing intermediate links, new data, into the process of thought. From this point of view, the proposition on the constant velocity of light and its

* Further details on the role of verification are to be found in the work of B. Juhos, *Die Erkenntnis und ihre Leistung. Die naturwissenschaftliche Methode*, Wien, 1950, S. 84-86, 89, etc. B. Juhos is probably right when he says that verification of the meaning of statements is applicable only in the case of the "empirical-hypothetical proposition".

independence of the inertial system of computing (Michelson and Morley, 1887) was obtained empirically, although the phenomenon itself cannot be sensuously perceived except through the medium of experimental apparatus. Exactly the same is true of the proposition on the quantum and wave nature of light and substance, although the wave and the particle, like the velocity of light, cannot be perceived by the senses.

The concept of the empirical has varied at various stages in the development of science.

We can, for example, single out three historical stages in the development of empirical cognition. The first stage covers ancient times, when there were no instruments or other means of sensitising man's sense organs, and their natural limitations therefore corresponded with the limitations of sensuous knowledge in general. The second stage is that of modern times, when man's sense organs reached out beyond their natural limitations with the help of instruments—telescope, microscope, the thermometer, etc. Objects that had previously been inaccessible or “unobservable”, were now “observable”, i.e., sensuously perceptible. The appearance of instruments and other means of empirical cognition undoubtedly raised man's sensuous knowledge to a new level, making it more complex not only because it introduced a new intermediate link between the cognising subject and the cognised object, but also because it posed the question of the incomplete coincidence of sensations and the objectively existing properties of the object. Thus there arose the problem of the relation between the objective and subjective in cognition (the problem of “primary and secondary qualities”). The third stage of empirical cognition relates to the state of science at the end of the 19th and beginning of the 20th century, that is, the current stage of sensuous knowledge. Its characteristic feature is that at the present stage the instruments and other experimental means (counters, bubble chambers, etc.) no longer make even the “image” of the object directly accessible to the human senses. The Geiger counter, for example, registers the motion of particles by means of a clicking sound (not to mention other empirical methods of registering elementary particles), and the cloud chamber shows the trajectory of movement of particles (there are also many other empirical tracking methods for registering their behaviour). The characteristic thing is that these instruments allow us to observe not the actual behaviour of the objects of the microcosm but the *manifestations* of this behaviour, and this makes the process of empirical cognition even more complex. It is not that the experimental apparatus is still imperfect, as the advocates of the “descriptive approach” in modern positivism may think. The point is the standard which in general has been reached by scientific knowledge of physical objects. A noteworthy feature of contemporary theoretical cognition

is that it operates with fundamental magnitudes, with theoretical constants, which represent hidden *stable relations*. This kind of relation cannot be directly discovered either by the sense organs or by instruments. A relation, if it is actually stable, is a law that we "observe" only from the standpoint of the results of its *operation*.

Thus we have a highly specific feature of the third stage of empirical cognition: the data of observation require logical interpretation precisely as data of observation, before any definite theoretical results or propositions may be obtained. This is why modern positivism, which is mainly concerned with empirical methods of cognition, sometimes calls itself "logical empiricism"

A dialectical contradiction can be resolved only by the theoretical method of analysing the intermediate links, even if these "links" are given empirically as a phenomenon or group of phenomena. The method of analysis of "intermediate links" still remains theoretical because it lies not in the simple discovery and registration of these phenomena but in analysing them as *relations* between empirically established, "verified" opposites.

Carnap does not take into consideration the fact that any law revealing a contradictory connection between variables is verifiable only insofar as it contains these variables, and that besides them it also contains the relation between them, which may be hidden, inaccessible to the empirical method. Therefore, if we were guided by his proposition that "a million positive instances are insufficient to verify the law; one counterinstance is sufficient to falsify it",* we should have had to reject long ago (together with vulgar political economy) the law of value, because as a rule goods are not sold on the market according to their value. In this case reality equally confirms and "refutes" a law obtained by theoretical means.**

In modern atomic physics there is a method known as the "S-matrix formalism", which studies the interactions of elementary particles by registering the initial states of particles entering a certain sphere of interaction and their states when exiting from it. This sphere turns out to be an "intermediate link", the features of which differ from the properties (behaviour) of the impinging and emerging particles, and which cannot simultaneously fail to combine these features. The S-matrix formalism is a theoretical method that takes into account the sphere of "mediating links"

* R. Carnap, *Philosophical Foundations of Physics*, New York, London, 1966, p. 21.

** Academician A. Migdal, the Soviet theoretical physicist, has some interesting observations on the connection between theory and experience. "The coincidence of theory with experience should not be the sole argument in the evaluation of theory. The quality of theory must be judged by its internal harmony, that is, by how convincingly and uncontradictorily it is constructed" (A. Migdal, "Simmetrichno li prostranstvo?" [Is Space Symmetrical?], *Nauka i Zhizn*, No. 9, 1971, p. 54).

Thus the theoretical resolving of the contradictions of the subject-matter lies not in supplementing the description of one picture of phenomena with a description of another, opposite picture, not in the exposure of the falsity or inaccuracy in one of the opposite assertions, but in the discovery of the “intermediate links” through which and thanks to which the contradiction exists and is realised. Quantum mechanics today stands on the threshold of the theoretical solution of the basic contradiction of its subject-matter, its fundamental antinomy — the contradiction between the wave and the corpuscle. Every science sooner or later is confronted with a fundamental antinomy, the solution of which endows it with systematic form and theoretical completeness.*

Dialectical logic took shape only at the beginning of the 19th century, when natural science became theoretical. It analyses the complex, mediated connections and relations of concepts expressing the complex and mediated connections and relations lying at the essence of things. At the empirical level of knowledge things and phenomena are given us in direct space-time connections and relations. So formal logic is quite adequate for studying such connections and relations. Here, as Engels said, it is a “method of arriving at new results, of advancing from the known to the unknown...”.** At the theoretical level traditional formal logic does not lose its significance but becomes a sublated, so to speak, element in the structure of the logical method known as dialectical logic.

Dialectical logic studies the forms of thought discovered by formal logic as a unified, integral system. As Engels put it, “...it develops the higher forms out of the lower”.*** Unfortunately, in Soviet philosophical literature up to now very few works have been written which make a detailed study of the transitions of some forms of thought into other, more complex ones in the course of advance of scientific knowledge.

In this connection an analysis of the following statement by Engels would be of considerable importance. “If our premises are correct and we apply the laws of thought correctly to them, the result must tally with reality, just as a calculation in analytical geometry must tally

* “The development of knowledge, the development of science,” writes the Soviet philosopher E. V. Ilyenkov, “brings philosophy back again and again to the problem of logical contradiction. The question of contradiction, of its real meaning, its source and the reason for its appearance in thought arises at the point where science approaches a systematic expression of its subject-matter in a concept, where thought has to build a system of theoretical definitions. In areas where there is only a systemless description of phenomena the question of contradictions does not arise. The simplest attempt to systematise knowledge immediately leads to the problem of contradiction” (E. V. Ilyenkov, *Dialektika abstraktnogo i konkretnogo v “Kapitale” Marksa (Dialectics of the Abstract and the Concrete in Marx’s Capital)*, Moscow, 1960, p. 222).

** Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 155.

*** Frederick Engels, *Dialectics of Nature*, Moscow, 1974, p. 223.

with the geometrical construction, although the two are entirely different methods. Unfortunately, however, this is almost never the case, and if so, only in very simple operations.”* This idea of Engels’ is practically never discussed, and yet it implies a very serious problem. Is one form of inference really sufficient to perform the transition from one theoretical concept to another?

A real situation of this kind was the problem which Bohr and Hevesy encountered in Rutherford’s Manchester laboratory when Hevesy attempted to isolate radium D from the whole mass of lead in which it was contained. These were elements of different atomic weight (207 and 210), but indistinguishable by their chemical properties. There appeared to be two ways out of the situation: either by declaring Mendeleev’s periodic law untrue and discarding it or by retaining Mendeleev’s law, according to which the chemical properties of elements depend on their atomic weight, and abandoning further research in this direction. According to a well-tested syllogism the picture was as follows:

I. Chemical elements have chemical properties that depend on their atomic weight.

II. Isotopes are chemical elements.

Conclusion: isotopes have chemical properties that depend on their atomic weight.

Here the premises are true, the syllogism is correctly constructed and yet the conclusion is false because only the physical and not the chemical properties of isotopes depend on their atomic weights. And yet the isotopes of every element in Mendeleev’s periodic table differ both in their chemical properties and their atomic weight from those of all other elements in the table and their isotopes, which testifies to the truth of Mendeleev’s proposition.

How was the problem solved? Bohr discovered a whole set of intermediate links connecting these two contradictory propositions—Mendeleev’s law and the independence of the chemical properties of certain isotopes on their atomic weight. The intermediate links were the concepts of the “positive charge of the nucleus”, the “neutral heavy particle of the nucleus” and, finally, the “electron shell”, which directly conditions the chemical properties of the atom. It is self-evident that the connection between the above-mentioned contradictory and yet true statements cannot be found with the help of only one kind of inference; there must be a whole *system* of them organised in an integral structure. This structure, this system of the forms of thought, is the logical method of the ascent from the abstract to the concrete. The study of the whole system of forms of thought as the structure of the process of ascent

* Frederick Engels, *Anti-Dühring*, Moscow, 1975, p. 385.

from the abstract to the more concrete concept is one of the most important problems of dialectical logic.

Because formal logic does not study this general form or structure of theoretical thought (the mode of the ascent from the abstract to the concrete), in which all known forms of thought are organised in a system of subordination, the classics of Marxist-Leninist philosophy regarded it as simpler than dialectical logic, but this does not signify any belittlement of formal logic, any suggestion that it is primitive or elementary in the worst sense of the term. Georg Klaus rightly observed that logic "...is elementary because it is the necessary but not sufficient prerequisite of any scientific thought. It is not elementary if by 'elementary' we understand something primitive and easy to master. There are logical problems which stand on the same level of difficulty as the most difficult problems of mathematics."* And Béla Fogarasi very truly remarks that "...formal logic may be expounded (although not in full) without a knowledge of dialectical logic, but the reverse is not possible".**

The second statement implies that dialectical logic embraces in a modified form (and "not in full") the principles of formal logic (and therefore it cannot be studied before formal logic), but adds to formal logic something that constitutes its specific nature.*** We have already considered this specific nature in content. Now we shall consider it from the standpoint of the interconnection of forms of thought.

Engels pointed out these specific features in his *Dialectics of Nature*. "Dialectical logic, in contrast to the old, merely formal logic, is not, like the latter, content with enumerating the forms of motion of thought, i.e., the various forms of judgment and conclusion, and placing them side by side without any connection. On the contrary, it derives these forms out of one another, it makes one subordinate to another instead of putting them on an equal level, it develops the higher forms out of the lower."****

Formal logic, in considering the immediate connections and relations between things and concepts, does not proceed from the general integral structure of the object. Therefore it does not indicate

* Georg Klaus, *Einführung in die formale Logik*, Berlin, 1958, S. 26.

** Béla Fogarasi, *Logik*, Berlin, 1955, S. 26.

*** In the opinion of the Soviet philosopher P. V. Kopnin, this is true only of traditional formal logic but not of modern logic, which is related to dialectical logic in just the same way as any "specialised branch of scientific knowledge" (P. V. Kopnin, *Dialektika kak logika [Dialectics as Logic]*, p. 94). This thought may be regarded as concretised in the notion put forward by Georg Klaus, who believes that mathematical logic belongs partly to traditional formal logic and partly extends beyond the bounds of philosophy. (See G. Klaus, *Einführung in die formale Logik*, Berlin, 1958, S. 328, 390.)

**** Frederick Engels, *Dialectics of Nature*, Moscow, 1974, p. 223.

either the beginning of the process of investigation or its direction. It indicates the conditions to be observed by thought moving in any direction. Its task therefore does not include the devising of rules for using all or the basic forms of thought in a strictly defined order.

At first glance this proposition would appear to indicate an absence of rigid restrictions, a wider freedom for the movement of thought. But in reality this freedom implies a definite limitation. The limitation lies in formal logic's inability to reveal in its own terms the logic of the subject-matter's motion as a whole. Thus, for example, deduction taken in itself, as an independent form of thought, ensures the extraction of new thought out of the previous thoughts (premises) by logical means, whereas reality is a process of motion, of development, that is to say, not only transition from one state to another but also the interweaving into this process of additional elements, the formation of new attributes, features, properties, and so on.

Since they are not able in themselves to reveal properly the intrinsic logic of the motion and development of an object, the forms of thought described by formal logic become a necessary condition for the cognition of this intrinsic logic of movement and development of the subject-matter on the theoretical plane of thought, but here they lose their independent significance and function as elements of a more complex whole—the mode of ascent from the abstract to the concrete. The formal side of theoretical thought is also provided for by the application of the laws and rules of formal logic and does, of course, have extremely important but not independent significance. On this formal side, too, every form of thought has great importance, but only as an element of the logical method.

Now let us consider the subordination of certain basic forms of thought in a little more detail.

Theoretical thought ascends from the abstract concept to the concrete. So its primary, initial "cell" is an abstract concept. The transition from one theoretical concept to another, to the next, is a comparatively complete "link" or "step" of analysis, of research. Any such "link" of analysis comprises a large set of statements (judgments) but cannot be reduced to these alone.

At every step of the investigation of any subject-matter the deriving of a more complex category from a simpler one is accompanied simultaneously by the movement of cognition from the sensuously perceived to the abstract, the general, from the external to the internal. Clearly, the prerequisite for any logical operation connecting two concepts is that each of them must have been formed on the basis of the elaboration of some sensuously given material. The mathematical point, the geometrical line, inertia, the ideal gas, the biological species, profit, etc., all these general concepts originally took the form of general notions that had arisen on the basis of the sensuous

perception of physical points, lines, actual gases, and so on and so forth. The formation of general abstract concepts establishing immediate connections and relations is only the prerequisite of theoretical thought. At this stage the laws and rules of formal logic are applied quite independently. Moreover, all forms of thought—judgments, empirical concepts, analogies, induction, deduction, analysis, synthesis, etc.—take part in the process. The concrete sensuous whole is mentally broken down into separate elements and this analysis is made by means of induction, the identical elements of objects being noted by means of comparison as elements common to different objects. So as not to “lose” this concrete whole, cognition by the same means “assembles” the separate elements into something that is externally unified. This synthesis is carried out by means of deduction. Thus, for example, if any kind of production, “production in general”, is characterised by the presence of labour, raw material, etc., one given production must also have these attributes. When classifying organisms, I enter a certain organism into one or another column of a table because I have given it a sign (united it with a sign) which justifies its being entered into that particular column. By means of deduction I “assemble” a specific handful of gunpowder with the appropriate dangerous properties which had been “explicated” previously by means of induction in any gunpowder, gunpowder in general.

All this abstract knowledge, these abstract concepts obtained by the movement of thought in various directions are for theoretical thinking only points of departure (each “link” or “step” of theoretical thought has its starting point). It subjects them to analysis and this analysis loses the independent significance it had at the empirical stage of cognition. Analysis in theoretical thought that ascends from the abstract to the concrete is simultaneously inductive and deductive. Possibly Lenin had in mind this very form of analysis when he wrote about the method Marx used in *Capital*: “A double analysis, deductive and inductive—logical and historical (forms of value).”*

If we take the transition from the classical principle of relativity to the theory of relativity (the latter is its further development), induction is here revealed in the transition from the individual, particular case to the more generalised case embracing a wider circle of cases (cases in which the space and time parameters of a moving body in various inertial systems of computation are invariant, and those in which this invariance is destroyed). At the same time deduction manifests itself in the fact that in the modern, more generalised principle of relativity we find new features and properties that were lacking in the classical principle, features and properties that make the modern principle of relativity more complex, concrete and specific in comparison with the

* V. I. Lenin, *Collected Works*, Vol. 38, p. 320.

classical.”* Thus, if we accept A. Uyemov’s precise definitions that “(a) deduction is inference the conclusion from which refers to objects that do not exceed the limits of the class of things mentioned in the premises, (b) induction is inference the conclusion from which refers to a wider range of objects than that which is indicated in the premises..., and (c) analogy is inference in which the conclusion refers to a different object from that indicated in the premises”,** we see that the given movement of thought (from the abstract to the concrete) embraces the structures of all the above-mentioned types of inference, with analogy occupying a transitional, so to speak, position between induction and deduction and combining certain features of both, namely the “transference” of features and properties of one object to another, which is at the same time the previous object expressed in the premises (propositions of the classical theory of relativity contained as an extreme case in the *opposite*, i.e., other, propositions of the modern theory of relativity).

The opposition between induction and deduction is eliminated in theoretical analysis because the latter starts off from the general and for the purpose of taking this general to a higher level, at which it becomes more concrete (acquires new features) and at the same time even more general (embraces a wider range of cases, and particularly opposite phenomena). Analysis, in which induction and deduction coincide, is only the expression of the real “analysis”, the analytical process, that occurs in the dialectical development of the internal contradictions of the object. The study of the motion of these internal contradictions, however, is impossible without theoretical analysis. Referring to the unjustifiable absolutising of induction by the empiricists, Engels observed: “With all the induction in the world we would never have got to the point of becoming clear about the *process* of induction. Only the *analysis* of this process could accomplish this.”***

The essence of theoretical analysis is to reduce the multiform aspects of an object to their intrinsic unity, or relationship, to the

* The assertion that, unlike deduction, the truth of an inductive conclusion is never certain (see R. Carnap, *Philosophical Foundations of Physics*, New York, London, 1966, p. 60) is not new and repeats Hegel’s thought on the “problematical” nature of an inductive conclusion (see *Hegel’s Science of Logic*, Vol. 2, London, 1929, p. 329). A new feature is the assertion that “inductive logic tells us how to calculate the value of this probability” (R. Carnap, *Philosophical Foundations of Physics*, p. 60). But this fact is for some reason brought forward as an argument against the understanding of the various inductive conclusions as movement of thought from the particular or general to the more general—an attempt which is extremely problematical. All the more so because, as A. Uyemov has proved, “one cannot single out deduction from other forms of inference on the grounds that its conclusions are always true. Deduction may yield probabilistic conclusions” (A. I. Uyemov, *Analogiya v praktike nauchnogo isledovaniya*, Moscow, 1970, p. 21).

** A. I. Uyemov, op. cit., p. 19.

*** Frederick Engels, *Dialectics of Nature*, Moscow, 1974, p. 228.

internal basis of the object, and to examine this basis in its “pure” form, unobscured by subsidiary or accidental features. It presupposes the singling out of what is the same in diverse objects, but it is not to be reduced entirely to this process. Such a process could also take place through the loss of certain essential factors or sides of the object. Thus the analysis of the “pure” commodity form could consist in abstraction from use value, which varies freely from one commodity to another, and concentration on the exchange value, which is the same in every commodity. But the theoretical analysis of the value of the commodity (the abstraction of which is obtained only with the help of formal-logical rules and laws) lies not in abstraction from its use value, not in the arbitrary separation of the commodity into two independent sides but in examination of the simplest relation between them, which is manifested in the case of the exchange of commodities for commodities, where commodities are taken in the unity of both their opposing sides. This involves an abstraction from such elements as money (a more complex form of commodity relations), mutual trickery by the barterers, and so on. Only those elements are examined without which the process would in principle be impossible, or — which is the same thing — the process is examined in its ideal form. In its “pure form” the process actually always exists as some kind of idealisation, which is one of the forms of scientific abstraction.

Ernst Cassirer notes that the interpretation of space and time only as a relation of two parameters constitutes the specific nature of the approach of the new natural science to cognition of the properties of space and time. Both space and time possess no absolute characteristics whatever, although the abstractions of space and time were evolved long before the appearance of the theory of relativity. It was the space-time relationship that Einstein scientifically analysed and this was why he succeeded in finding the internal connection between them, their relativity, the dependence of their properties on a system of coordinates moving evenly and in a straight line relative to any other system. Moreover, Einstein achieved abstraction (and this is his advantage over Lorentz, Jánossy and others) from the resistance of the environment, from the density of the moving body (an absolutely hard core is a core with virtually no density), from electro-magnetic interactions, etc. Nothing remains in the analysis except the relation of the space-time parameters (velocity is also reduced to this relation). It is the different values of velocity which show this relation in a dynamic that allows us to study the relativity of the properties of space and time, their non-independence. If the abstractions of space (with its properties taken separately) and time (with its properties also taken separately) were analysed, they would turn out to be by no means dynamic concepts; they would be dead concepts from which nothing could be inferred except the prop-

erties of infinite division, homogeneity, etc., properties with which nothing can be constructed and no concrete form of real movement can be produced. But these abstractions had to be preliminarily isolated so that the analysis of the space-time relation could take place. Abstractly universal concepts are a prerequisite of any theoretical analysis.

In modern physics the mental or idealised experiment has acquired great importance and its achievements as a methodological device in theoretical cognition are indisputable. But the word "experiment" has led some people to regard this methodological device merely as a variety of experiment as such, merely as an empirical means of cognition. Such an interpretation erases the distinction between experiment and theoretical thought. Every experiment involves connection of the subject with a real object of cognition. So an experiment means going beyond the limits of theoretical thought and linking the theoretical with the empirical.

The mental experiment, on the other hand, takes place entirely in the sphere of theoretical thought and has no relation to actual experiment. The only thing that relates it to the latter is the image, which in any case is idealised ("Einstein's train", the absolutely hard core, etc.). The "mental experiment" is a theoretical analysis in which the "image" is created so that the abstracted parameters of the object under investigation can be placed in a certain relation to each other, rather as Marx in *Capital* speaks of the coat and the linen being exchanged for one another, although in reality they would probably never have been exchanged.*

Theoretical analysis is performed on the principle of "the splitting of a single whole and the cognition of its contradictory parts".... "The condition for the knowledge of all processes of the world in their 'self-movement', in their spontaneous development, in their real life, is the knowledge of them as a unity of opposites."** What has already been said confirms the correctness of this proposition.

Besides simultaneously inductive and deductive movement, theoretical analysis comprises something else that prevents it from being regarded as simply the sum-total of induction and deduction. This specific element of analysis, which cannot be reduced to either induction or deduction, is the establishing of the intrinsic unity between the various forms of the phenomenon. It took a powerful analytical mind to perceive the intrinsic unity between the weight of

* As G. Klimashevsky rightly remarks, the mental experiment implies a "form of abstraction" (see G. Klimashevsky, "Teoretiko-poznavatel'naya rol myslennogo eksperimenta v fizike", *Teoriya poznaniya i sovremennaya nauka [Theory of Cognition and Modern Science]*, Moscow, 1967, p. 178). Sometimes the mental experiment is called the "idealised experiment" (see Albert Einstein and Leopold Infeld, *The Evolution of Physics*, New York, 1954, p. 22).

** V. I. Lenin, *Collected Works*, Vol. 38, pp. 359, 360.

objects on Earth and the attraction of the planets (Newton's discovery), between atomic weight and the various chemical properties of different elements (Mendeleyev's discovery), between changes in the geographical environment and biological species (Darwin's discovery), between the living cell and the higher organisms (the discovery of Goryaninov, Purkinje, Schleiden and Schwann), between the mechanical equivalent of heat and the mutual transformation of all forms of energy (Joule, Lenz, Meyer, Grove), between the phenomenon of the photo-electric effect and the discrete nature of light (Einstein's discovery), between the form of exchange "X ounces of gold for Y kilogrammes of wheat", and the form "one coat for three metres of linen" (the discovery of bourgeois classical political economy), between surplus value and the law of value, between profit, interest, rent and surplus value, etc. (Marx's discoveries), between the monopolistic form of the organisation of capitalist production and world wars, between capitalist monopoly and the leap-like development of the capitalist countries, etc. (Lenin's discoveries).

Thus from the foregoing we see that analysis emerges as synthesis, the unification of opposites. But this synthesis is still abstract because the intermediate links connecting these opposed elements in a complex, concrete unity have not been investigated. So analysis, which directly coincides with abstract synthesis, is deepened and complemented by the investigation of the intermediate links, and thus grows (in the course of this investigation) into a genetic inference of one category from another. In genetic inference analysis and synthesis indirectly coincide, as a result of the investigation of the intermediate links. Genetic inference in this sense is the concrete form of synthesis.

Genetic inference is a logical operation because it is concerned with concepts, connecting the more simple and general concept with the more complex and more particular, but in such a way that the latter preserves the content of the previous concept as a subordinate element or side of the new content. At the same time genetic inference in the structural respect coincides with the direction of the development of things, with the logic of the real transformation of one form of things into another, with the "process of formation" of the object. The transformation of a simpler object into a more complex one is impossible without additional factors being involved in its movement, factors which mediate this movement and make it more complex. So logical inference that takes into account the actual origination of the complex from the simple in this way is called genetic inference.

We considered above an example of ascent from the abstract concept to the concrete through analysis of the intermediate links. In doing so we asserted that the analysis of each intermediate link taken

separately involves inductive generalisation, insofar as thought must take the link in a generalised form. But it would also be true to say that each intermediate link is investigated by means of deduction, insofar as thought must determine to what type of phenomena the given intermediate link belongs. For example, one of the intermediate links in atomic theory is the positive charge of the atomic nucleus. The generic concept in this case is the concept of "charge" Since the time of Coulomb we have known the general properties of charge in general. On this basis it became possible to understand, to study the properties of the positive charge of the atomic nucleus discovered in Rutherford's laboratory as a specific type of charge. What at one time had been studied by means of induction received further logical elaboration by the deductive method.

Thus in genetic inference deduction and induction, and also analysis as the unity of the two are retained as sublated but necessary elements. So genetic inference may not be reduced either to induction or deduction or to analysis or to abstract synthesis, although all these operations are easily found in genetic inference.

In its turn, genetic inference is sublated in the logical method of the ascent of theoretical thought from the abstract to the concrete. This method reveals the relation between the initial concept and the final, culminating concept. It demonstrates the circular character of the movement of theoretical thought in which the result of genetic inference serves as the basis for further analysis. The final result is that analysis and concrete synthesis (genetic inference) emerge as two sides of the circular movement of theoretical cognition ascending from the abstract to the concrete. Thus, the genetic inference in Marx's *Capital* of the final concept of capital from its more simple definitions was at the same time an analysis of various national, i.e., particular, forms of capital. This analysis formed the basis on which Lenin genetically inferred from the general definitions of capital as such the special concept of monopoly capital. From the classical principle of relativity Einstein genetically inferred the modern theory of relativity (the intermediate links were the postulate on the constancy of the velocity of light and the relation $\sqrt{1-v^2/c^2}$). This theory may in its turn provide an analysis of the relativistic properties of the movement of macrobodies and quantum mechanics processes occurring at velocities close to that of light.

Genetic inference is one of the elements of the method of ascent from the abstract to the concrete because, like analysis, it expresses the relation of the simple to the complex, the non-abstract and the concrete. The method of ascent from the abstract to the concrete embraces the whole process of theoretical thought, beginning from operations with general abstract (or abstract universal) concepts, while genetic inference takes as its premise the ready-made result of analysis—the concrete relation. The ascent from the abstract to the

concrete is not simply a special form of inference, but a system of forms of thought. It is therefore a *logical method* of cognition, a method of theoretical representation of the essence of the object in all its concrete integrality.

In this connection the question of the nature of philosophical proof assumes a special importance. Philosophical proof cannot be reduced to the procedures of empirical testing or even to the criterion of practice. If by philosophical proof we mean a definite logical process, philosophical proof lies in portraying the *process* of transition from one theoretical concept to another. Wittgenstein believes that "proof in logic is only a mechanical expedient to facilitate the recognition of tautology, where it is complicated" *

But in the theoretical movement of thought tautology is only a moment of identity of the initial concept and the result, a moment which can by no means overshadow the fact of the emergence of new knowledge. Thus we are here faced with the problem of the coincidence of logical proof with the course of theoretical investigation.

This is intimately connected also with the problem of the creative nature of theoretical thought, the problem of the systematic portrayal of the integral essence of the subject-matter, the methodological role of dialectical logic in relation to theoretical natural science and the sciences of society, etc.

Summarising what has been said, it may be stated that dialectical logic is connected with the movement of theoretical cognition and studies its structure from the standpoint both of the whole system of the forms of thought and the relation which these forms have with its general content, the source of which is the objectively operating laws of dialectics.

* Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, London, 1955, p. 167.

IDEOLOGY AS A PHENOMENON OF SOCIAL CONSCIOUSNESS

The problem of the social conditioning of consciousness was first posed in all its fullness and scientifically solved by Marxism. It was the founders of Marxism who proved that the roots, the sources of both the relatively true and the illusory reflections of reality are to be sought in the peculiar features of the actual process of the life of society, in the conditions of social being. The general laws they discovered governing the relationships between social being and consciousness, between the material and spiritual life of society, between the basis and the superstructure, formed the methodological foundation for the materialist approach both to society as a whole and to the study of its spiritual, intellectual aspects. This opened the road to a more specific and differentiated scientific analysis of the social conditioning of social consciousness. This differentiation has proceeded in several directions. One line of research is to discover the actual mechanisms determining social consciousness under various historical conditions. Another line is to define the specific nature of the connection between social conditions and various phenomena of social consciousness. Of course, it must be remembered that these lines of research are not isolated from one another. They are interconnected and intersect at many points. We encounter such an intersection when we analyse ideology as a specific phenomenon of the social consciousness.

The problem of the nature of ideology, its specific features, relationship to the various forms of social consciousness, the assessment of its role in social life, and so on, has over a number of decades lost none of its relevance both as the focus of sharp ideological clashes between Marxism-Leninism and the bourgeois and revisionist conceptions, and as a scientific problem whose further elaboration is of direct practical use in ideological work and the ideological struggle. Bourgeois sociologists and revisionists go out of

their way to refute the Leninist conception of scientific ideology by placing ideology in direct opposition to science and *denying the very possibility of a scientific ideology*. Thus, Raymond Aron defines ideology as “*a global system of interpretation of the historico-political world*” (italics by R. Aron.— V K).^{*} Arguing that any claims to have achieved such an interpretation are unscientific, the author uses this apparently “neutral” definition to criticise Marxism-Leninism and its philosophico-historical conception. In the same vein as Aron, Daniel Bell writes of the “exhaustion of the nineteenth-century ideologies, particularly Marxism, as intellectual systems that could claim *truth* for their views of the world”.^{**} According to Werner Stark, ideology “deals with a mode of thinking which is thrown off its proper course...” He argues that it has its source in the subconscious, that, as distinct from science, ideology “...belongs much rather to the sphere of psychology”.^{***} Jacob Barion of the Federal Republic of Germany, “systematising” the views on the subject to be found in bourgeois literature, declares that the word “ideology” is now used mainly in the pejorative sense, that “ideological thinking is defined as thinking that bears no relation to reality”^{****} A vast number of such definitions could be cited. But we have enough here to show the general tendency to interpret ideology as a distorted consciousness, an interpretation which prevails in bourgeois literature and is repeated by various authors in a variety of ways. This trend goes back to the 1920s, and particularly to the work of Karl Mannheim, who demanded that the methods of “the criticism of ideology” should be applied to Marxist theory itself. Mannheim’s work exercised a great influence on the approach that was taken to the problem of the theory of ideology in bourgeois philosophy and laid down the basic lines of criticism of Marxism as an ideology.

Revisionist literature, following this kind of interpretation of ideology, tries to “save” Marxism by declaring that it is not an ideology at all. “Marxism is not an ideology. Marxism is a philosophy and a science,”^{*)} writes Ernst Fischer. Such a contrasting of ideology, philosophy and science, and also the allegation that making Marxism into an ideology entails the distortion of its intellectual nature clearly contradicts the Leninist interpretation of this problem.

So the different interpretations of ideology are not merely academic. They reflect the class and social position of the various theoreticians and their relationship to the revolutionary movement, to

^{*} R. Aron. “Société industrielle, idéologie, philosophie”, *Preuves*. No. 169, 1965, p. 32.

^{**} Daniel Bell, *The End of Ideology*. The Free Press of Glencoe, Illinois, 1960, p. 16.

^{***} W. Stark, *The Sociology of Knowledge*, London, 1958, pp. 48, 51.

^{****} Jacob Barion, *Was ist Ideologie?* Bonn, 1964, S. 45.

^{*)} Ernst Fischer, “Marxismus und Ideologie”, *Weg und Ziel*, No. 5, 1965, S. 353.

Marxist-Leninist theory. Their understanding of the concept of ideology directly or indirectly reflects their acknowledgement, denial or distortion of Marxism-Leninism. Here, in brief, we have the ideological-theoretical setting of the problem. In our view the problem of the nature of scientific ideology can be correctly stated and solved by opposing it to illusory ideology. Although both the one and the other are ideologies, the mechanisms of their formation, distribution and influence on social life, not to mention their theoretical content, are of distinctly different quality.

The most profound analysis of the essence and specific features of the ideological process in a society torn by class antagonisms was provided by the founders of Marxism, who thus gave us the basis for a theory of ideology. Their analysis fully retains its theoretical significance today. Marx and Engels regarded ideology as illusory consciousness, but their views of ideology differ fundamentally from the interpretation of ideology that is current in contemporary bourgeois literature. What is more, the bourgeois theoreticians ignore the fact that the Marxist concept of ideology was developed in the works of Lenin and has since been interpreted in a wider sense. It has been shown that it is possible to take a scientific or unscientific approach within the framework of the phenomenon of ideology itself. In this essay we shall try to examine the extension of the concept of ideology and the objective grounds for a scientific ideology as a substantiation of Lenin's conception.

* * *

Why was all ideology illusory for Marx and Engels? It seems to us that they proceeded from the empirical and historical reality, namely from the fact that "hitherto men have always formed wrong ideas about themselves, about what they are and what they ought to be".* After all, even a revolutionary period was not to be judged by its consciousness, not to mention the periods of comparatively peaceful, evolutionary development when the ideology of the ruling class was dominant.

Criticism of these notions, according to Marx and Engels, should consist not merely in offering correct notions instead, but in revealing the true basis of these false notions and helping to change it. Why do people invent false notions? What is the basis, the root of them? In *The German Ideology* Marx and Engels answered these questions quite unambiguously:

"If in all ideology men and their relations appear upside-down as in a *camera obscura*, this phenomenon arises just as much from their historical life-process as the inversion of objects on the retina does

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, p. 23.

from their physical life-process.”* And further they state that they set out “from real, active men, and on the basis of their real life-process demonstrating the development of the ideological reflexes and echoes of this life-process”.**

So ideology is a necessary product of “the material life-process” This is the initial general proposition which is undoubtedly applicable to *any* ideology. To spell it out, the “material process of life” is the mode of production of material goods and the corresponding social relations, which at certain stages of social development appear as relations between classes and are reflected in their ideologies as the spiritual expression of their interests, their class consciousness.

This proposition in its general form also applies to any ideology. But at this point one finds a fundamental difference between the mechanisms that generate the unscientific and the scientific ideology. The illusoriness of the ideology of the exploiting classes is related to the fact that in expressing a special (selfish, mercenary) interest of a given class it endows it with the form of *universality*: “For each new class which puts itself in the place of one ruling before it is compelled, merely in order to carry through its aim, to present its interest as the common interest of all the members of society, that is, expressed in ideal form: it has to give its ideas the form of universality, and present them as the only rational, universally valid ones.”*** Marx observes that “in the beginning, this illusion is true”,**** because during periods of revolution in the struggle against the forces of the old society the majority of society actually becomes temporarily united. Later this alliance collapses and the differences between its heterogeneous social forces appear. Under these conditions the “illusion of universality” ceases to be true and the ideas of the ruling class become a reactionary force that seeks to justify its privileged position. They cease to express even indirectly the interests of the majority and therefore their assertion and dissemination amount to the *imposition* of alien views upon the majority of society—the working people. This is what we call a situation of *intellectual oppression*. Activity within the framework of this situation consists either in manipulating the consciousness of the masses in order to subordinate them to the ruling ideology and policy, or in rejecting this situation, protesting against both social and intellectual oppression.

Thus the logical basis of the distortion of consciousness in ideology is the presentation of the particular (particular interests, aspirations, aims, etc.) as the universal, i.e., their definition as universal social interests and social being. This metamorphosis, like any absolutisa-

* Ibid., p. 36.

ibid.

Ibid., p. 60.

**** Ibid., p. 61 (see Note).

tion of the particular, the individual, its elevation to the rank of universality, involves a distortion of reality, the conversion of ideology into distorted consciousness. From this it follows that the breadth of the *social basis of ideology* makes a great deal of difference to the relation it bears towards reality.

If consciousness, whose social context determines, as we have seen, its intention, its position in relation to social reality, actually expresses the interests of the majority of society, the mechanism of elevating the particular to the rank of the universal ceases to function. In other words, society no longer needs to be fed on illusions about its position, its structure. The universal interest is understood in a universal form, that is to say, in a form that corresponds to its nature. This means that society (class) ceases to require any distortion of reality and, on the contrary, tries to obtain the truest picture possible at the given stage in the development of social relations.

This was the problem that confronted Marx and Engels. How did they solve it? They showed that it is in the position and interests of the proletariat, as the dispossessed majority, that the universal negation of capitalism—the existing world of wealth—is concentrated, and that this negation takes place in conditions of the powerful and universal development of the productive forces as the basis of people's universal intercourse which breaks the local barriers. The consciousness corresponding to this position, i.e., the class consciousness of the proletariat, must therefore shift away from the ground of the idealist understanding of history, break through the nets of illusory ideology, and work out an approach to reality and its spiritual integument which “remains constantly on the real *ground* of history”.* In other words, the proletariat, in contrast to previous classes, so Marx and Engels argued, requires no illusions as to its position or tasks and its class consciousness must and can be scientific. The founders of Marxism set themselves the task of developing this consciousness and successfully accomplished it, thus converting socialism from a utopia into a science.

This result already implied the possibility of defining the class consciousness of the proletariat, expressed by Marxism, as a scientific ideology. The founders of Marxism themselves did not do this because the scientific ideas of Marxism had not at that time become a real component of the consciousness of the exploited masses. But with the emergence of the Marxist parties and the spread of the ideas of Marxism, its use as a guide in the practical struggle, Marxism actually did turn into a *scientific* ideology, bearing in mind the fact that ideology represents *class* consciousness. This was the conclusion drawn by Lenin and it forms the basis of the conception of scientific ideology.

* Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, pp. 53-54.

Another feature of the illusory ideology or “ideological process” which the founders of Marxism often pointed out (see Engels’ well-known letters) is the fact that the ideologist is not aware of the real motive forces that prompt him to act. He is concerned with the material of thought and derives the form and content of the thinking process from pure thought, either his own or that of his predecessors.* But the materialist understanding of history stripped this illusion of its veils and exposed the material social-class foundations of ideology. Marxism openly links its theoretical constructions with the class interests of the proletariat. Marx and Engels wrote that “as philosophy finds its *material* weapons in the proletariat, so the proletariat finds its *spiritual* weapons in philosophy”.** Lenin stressed that “materialism includes partisanship, so to speak, and enjoins the direct and open adoption of the standpoint of a definite social group in any assessment of events”,*** that Marxist theory “combines the quality of being strictly and supremely scientific (being the last word in social science) with that of being revolutionary, it does not combine them accidentally and not only because the founder of the doctrine combined in his own person the qualities of a scientist and a revolutionary, but does so intrinsically and inseparably. Is it not a fact that the task of theory, the aim of science, is here defined as assistance for the oppressed class in its actual economic struggle.”****

Thus scientific ideology is linked with its social base in a fundamentally different way from illusory ideology, in the sense that it not only does not distort reality (because it is the last word in social science), but is also clearly aware of the material and social roots of its origin and development. This fact determines a new type of ideological continuity which is characteristic of scientific ideology.

As Engels observed, in ideology the economy creates nothing anew, it determines to a large extent indirectly the way in which the thought material found in existence is altered and further developed.†) And every new idea or principle must in some way be related to previous ideas, must take the form of their further development. This fact expresses the relative independence of ideology, as a result of the division of labour, the relative isolation of the ideological sphere from other spheres of social science. But the influence of the economy and the interests associated with it makes itself felt in the fact that through a series of intermediate links it determines what ideas

* See Karl Marx and Frederick Engels, *Selected Works*, in three volumes, Vol. 3, Moscow, 1973, p. 496.

** Karl Marx, Frederick Engels, *Collected Works*. Vol. 3. Moscow, 1975, p. 187.

*** V. I. Lenin, *Collected Works*. Vol. 1, p. 401.

**** *Ibid.*, pp. 327-28.

†) See Karl Marx and Frederick Engels, *Selected Works*, in three volumes, Vol. 3, Moscow, 1973, p. 494.

and what thought material are used for the building of the ideology of the new period—either the reactionary political, philosophical, etc., ideas of the past or the continuing progressive line of development of social thought.

Continuity in the sphere of scientific ideology is fundamentally different in character. On this point Lenin wrote that “socialism, as the ideology of the class struggle of the proletariat, is subject to the general conditions governing the inception, development and consolidation of an ideology; in other words, it is founded on the sum-total of human knowledge, presupposes a high level of scientific development, demands scientific work, etc., etc.”*.

Here Lenin is speaking of *scientific* ideology as distinct from the psychology of a class, its interests, which arise out of the immediate conditions of its life and not out of the development of science, i.e., are not based on the whole range of material of human knowledge. This means that Marxism obeys the laws of *scientific* continuity, relies on the objectively true data of science, on the progressive line of development of social thought.

As we know, the founders of Marxism linked the relative independence of intellectual life in general and ideology in particular with the separation of mental from physical labour. It is this form of the division of labour that helps to form various kinds of ideological illusions, by obscuring the connection between ideas and their material foundation.

“Division of labour only becomes truly such from the moment when a division of material and mental labour appears. From this moment onwards consciousness *can* really flatter itself that it is something other than consciousness of existing practice,... from now on consciousness is in a position to emancipate itself from the world and to proceed to the formation of ‘pure’ theory, theology, philosophy, morality, etc.”**

Thus in analysing the way the illusory ideology is formed we must take into consideration its relative independence, which is what sets the stage for the isolation of ideological activity, for making its relative independence absolute, for fortifying the illusion that the world must be formed and transformed in accordance with this or that ideological construction, that it can be changed by substituting one set of thoughts for another. Marx and Engels declared a ruthless war on this idealistic view of history and proved that social life is practical, that only by means of revolutionary practical activity can the world be changed, that new ideas can take one beyond the limits of the ideas of the old system, but not beyond the limits of the system itself.

* V I. Lenin, *Collected Works*, Vol. 6, p. 163.

** Karl Marx, Frederick Engels, *Collected Works*, Vol. 5, Moscow, 1976, pp. 44-45.

The relationship between ideology and the material conditions that engender it may therefore be regarded as the interaction of two social spheres, of which one ultimately determines the modification of the available thought material, while the other has a reciprocal influence on the conditions of life engendering it and helps either to consolidate the existing social relations or to change them.

Scientific ideology is also formed on the basis of the relative independence of the intellectual sphere of social life. But in contrast to the illusory ideology, it develops not only a scientific consciousness of reality itself, but also its own self-consciousness, an internal reflection, awareness, so to speak, of the character of its connection with the material conditions of life, the interests of various classes. In other words, it takes a scientific attitude to its own genesis and development.

A characteristic feature of ideology is the fact that it contains definite guidelines for action. This is particularly true of such ideological forms as political ideology, morality, and the legal consciousness. These "guidelines for action" may be direct or indirect, immediate or mediated, they may stimulate active, revolutionary action designed to change reality or, on the contrary, encourage adaptation, a passive attitude to reality, or a tendency to avoid participation in the solution of great social problems. Everything depends on the character of the ideology in question.

Illusory ideology and scientific ideology are fundamentally different in this respect. Illusory ideology, existing in conditions of spontaneous social development, cannot by its very nature overcome this spontaneity. Even if it is progressive and for a time unites the masses to deal with urgent social tasks (for example, the bourgeois ideology of the period of bourgeois revolutions), it does not bring results that accord with the original goals. Conservative ideology, on the other hand, which distorts the existing reality and misrepresents its prospects, must in any case sow illusions. Mannheim was right in his way when he defined the future-oriented ideological consciousness as a utopian consciousness. His mistake was that he extended this characteristic to any ideology, that he denied the possibility of a scientific postulation of the goals and tasks of social activity. This idea has become one of the mainstays of the bourgeois interpretation of the forecasting of social trends and prospects. The revisionists took Mannheim's idea literally and hastened to condemn as utopian Marxism's orientation towards creating a better social system. The peculiar feature of Marxism, Fischer states for example, "consists in the combining of science and utopia" He interprets the transition from utopian to scientific socialism as "not rejection", not the abolition of utopia, but its preservation in sublated form: "In Marxism ... utopia is included as a *real* possibility, it is preserved, it is

sublated.”* This absurd muddle, this eclectic position based on the ambiguous use of the word “utopia” is Fischer’s way of denying the possibility of scientific ideology. He is ready to “combine” science and utopia within the framework of Marxism as long as he can get rid of the Leninist conception of scientific ideology.

Raymond Aron, as a direct and open opponent of Marxism, takes a more outspoken attitude. He writes: “I don’t know what the future holds for mankind, but I do know that we do not know this. And those who pretend that they do know are falsifiers.”** One can hope and no more, “but not present our hope as certainty, much less put faith in the laws of history or the activity of some party (or some class) which is to realise this hope”***

But this denial of any possibility of a “global assessment” of socio-historical reality, of any possibility of scientific forecasting of the future, is organically connected with two essential aspects of modern bourgeois ideology. First, with the “end of ideology” conception, which appears to be replacing ideology by “technical decisions”, i.e., social engineering designed to evolve means of manipulating mass consciousness in the interests of the ruling class. Second, with criticism of socialism as a kind of society that in setting itself the task of realising a definite, ideologically formulated goal, condemns itself to obedience to a totalitarian political regime that is incompatible with democracy. What these charges add up to in practice is that denial of the active role of revolutionary ideology is a means of damping down the social activity of the masses, a form of defending the bourgeois political system, which with the help of all kinds of “democratic institutions” ensures the actual domination of monopoly capital.

Marxism solves the problem of its relation to the future from fundamentally different positions. People have always striven to see into the future, to tear aside the veils of time. All kinds of notions of the future—mystical, fantastic, utopian—have been developed in various periods. Some of them have contained brilliant conjectures that have been confirmed by the subsequent course of history. But the question arises as to whether one can put the problem of predicting the future on any realistic base. Marxism gives a positive answer to this question. After all, the future is the continuation of the present, the present contains the embryo of the future, though it may be concealed in hidden tendencies or the merest allusions. But if we are able to determine how fundamental these tendencies or allusions are, if we discover the laws of motion of various social organisms, the

* Ernst Fischer, *Kunst und Koexistenz*, Hamburg, 1966, S. 51.

** R. Aron, “Société industrielle, idéologie, philosophie”, *Preuves*, No. 169, 1965, p. 30.

*** Ibid.

future can be foreseen to a high degree of probability. In any case one can foresee the tendencies which are viable and progressive and identify the forces that are capable of and interested in the victory of these progressive tendencies.

What or who is to be given the task of discovering them? Science. This means that social science must make it possible to foresee the future and to determine on the basis of scientific data the goals, action programmes, strategy and tactics of struggle, to determine the means needed for dealing with any task that may arise. The task of science, a task that Lenin particularly stressed, is to provide a true slogan of struggle, that is to say, to use knowledge in order to build up the social force that is capable by its actions of providing scope for the progressive tendencies of social development, for the transformation of social reality. Insofar as science formulates these goals and tasks, it begins to fulfil the functions of ideology—scientific ideology. The participation of science in defining the aims of the social activity of classes and the aims of societies is becoming an ever more real fact in the life that we live today. Even bourgeois ideology has produced the specialised “science” of futurology, which tries to monopolise all forms of scientific prediction of the future. Without attempting any assessment of the essence and possibilities of futurology, we would remark here that the contemporary monopolistic bourgeoisie shows no inclination to ignore the problems of determining the future. The scientific and technological revolution has evoked a tremendous flood of literature expounding various conceptions of things to come (post-industrial, technotronic, post-capitalist, etc. societies), all of them opposed to the ideas of communism; all kinds of predictions, including long-range forecasts, are made. It would therefore be battering at an open door to attempt to prove the possibility of forecasting the future on the basis of the data of social science. It is also quite clear that in assessing the prospects of social development ideological position plays a significant part. In the case of bourgeois futurology, the futurologists’ ideological position tends to distort the notions of the future.

From the very beginning Marxism built its understanding of the future on the basis of science. Its ideological position follows from scientific cognition of the laws and essence of the historical process. Marxism has always seen in science a creative force capable of taking an active and positive part in determining the prospects of social development and the revolutionary transforming activity of the working class, the mass of the working people. We have already quoted Lenin’s statement on the role of science in the class struggle of the proletariat. This proposition clearly characterises the Marxist understanding of the problem. Marxism does not comprise a utopia, even in sublated form; it overcomes this utopia. The scientific definition of the programme of action by the masses, of goals and

means, of policy and the ways of its realisation is a characteristic and essential feature of scientific ideology. The founders of Marxism-Leninism defended this position and also stressed the fact that the forms of action, specific to the conditions of certain countries and epochs, must be determined on the basis of continuous creative study of the existing conditions and generalisation of the experience and initiative of the masses.

There is yet another aspect of ideology connected with the process of its real functioning in society. This is the degree of its dissemination and hence its influence on the consciousness of various social groups, on social consciousness as a whole. Insofar as ideology is created by the "literary representatives" of a certain class and therefore acquires a theoretical, conceptual form, the extent of its influence on social processes is directly proportional to its dissemination, to its influence on people's minds.

Analysis of the problem of the dissemination and assimilation of ideology is an important aspect of ideological theory, which covers a range of problems that cannot be dealt with in the present article. We can draw attention only to certain aspects of the problem.

To begin with, the ideas expressed in one or another system of ideology must, in order to be perceived by the mass consciousness, conform in content to the interests of a certain social community, group or society, i.e., they must have a suitable "ground", which is prepared not by ideology but by the actual process of socio-economic development. Further, there can be no vacuum in the sphere of ideology. The seeds of new ideas are not sown on virgin soil, new ideas must win people's minds in conflict with old ideas, that is to say, they depend on the activity of the forces that seek to put these ideas into effect.

Finally, it must be noted that the dissemination of ideas has a reciprocal influence on the ideas themselves, in the sense that ideas designed to be spread among the masses must be presented in a form the masses can accept and understand, and this depends on the level of development of their social consciousness.

Thus problems of the social determination of the ideological process arise not only when we are considering the genesis of ideology but also with regard to its functioning, its perception by the mass consciousness.

In this respect too, there is a fundamental difference between scientific and unscientific ideology.

The soil for the spread of the illusory ideology is cultivated by conditions in which the masses themselves need illusions regarding their position. This idea has been sufficiently developed in Soviet literature with regard to the spread of the religious consciousness and various fetishistic ideas. The illusory ideology adapts itself to the level of mass consciousness and speculates on ignorance, prejudice and

popular fallacies. Moreover, the ideology of the exploiting classes, which far from expressing the interests of the masses actually contradicts them, is imposed upon the masses by every available means of suggestion.

On the contrary, the scientific ideology helps the masses to become aware of their own fundamental interests and raises the spontaneous struggle to the level of a conscious political movement; it transforms the class "in itself" into a class "for itself". Its dissemination is encouraged in conditions when the solution of the tasks confronting society becomes inconceivable without a scientific understanding of the laws of social development, without scientific forecasting of the prospects and possible results of the class struggle or the activity of the whole of society. As we know, such conditions are created when the tasks of the socialist transformation of society are placed on the agenda. Socialism is built on scientific foundations. The development of socialism involves a new type of historical development characterised by the attraction of ever wider masses into the conscious making of history. This is what fundamentally distinguishes socialism from all previous societies. In this context the scientific ideology becomes a necessary and essential component of the process of creating new forms of social life.

Marxism-Leninism, as was pointed out at the 25th Congress of the CPSU, "gives us an understanding of the historical perspective, helps us to determine the lines of our socio-economic and political development" *.

Thus Lenin's conception of scientific ideology discloses features that distinguish it in principle from the illusory ideology not only as regards content but also in respect of the mechanisms of its origin and dissemination among the masses, the modes of its functioning and development. It therefore seems particularly important at the present stage to discover all the parameters in which scientific and illusory ideology differ.

* *Documents and Resolutions. 25th Congress of the CPSU, Moscow, 1976, p. 87.*

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Сдано в набор 20.IV.1976 г. Подписано в печать 27.9.1976 г.
Формат 60×84 1/16. Бумага офсетная
Услови. печ. л. 15,81. Уч.-изд. л. 20,30
Тираж 31590 экз. Заказ № 734. Цена 1 р. 77 коп.
Изд. № 20792.

Издательство «Прогресс»
Государственного комитета Совета Министров СССР
по делам издательств, полиграфии и книжной торговли,
Москва 119021, Zubovskiy bulvar, 21.

Ордена Трудового Красного Знамени Первая Образцовая
типография имени А. А. Жданова Союзполиграфпрома при
Государственном комитете Совета Министров СССР
по делам издательств, полиграфии и книжной торговли
Москва, М-54, Валовая, 28.

Можайский полиграфкомбинат «Союзполиграфпрома» при
Государственном комитете Совета Министров СССР по делам
издательств, полиграфии и книжной торговли г. Можайск,
ул. Мира, 93.

